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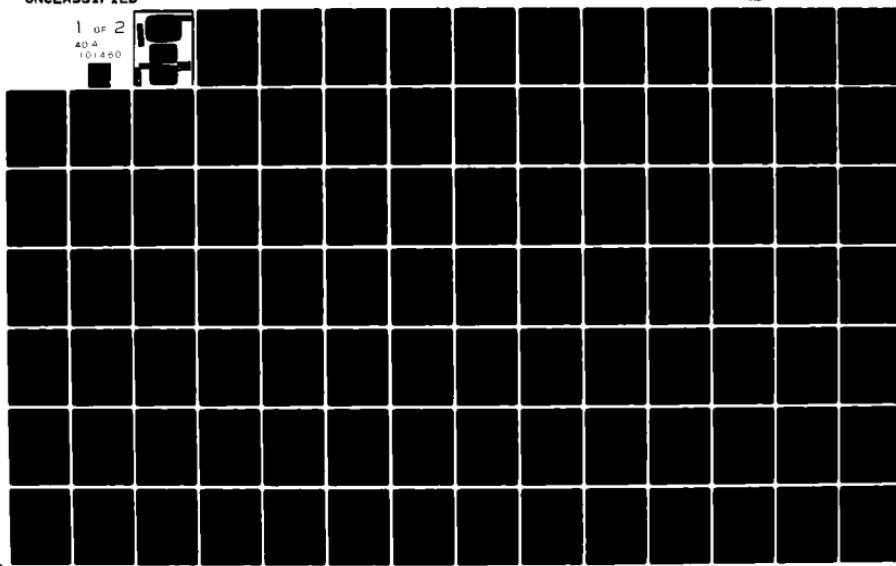
OFFICE OF PERSONNEL MANAGEMENT WASHINGTON DC
STUDY OF ONLINE INSTRUCTION METHODOLOGIES FOR THE DTIC TRAINING--ETC(U)
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STUDY OF ONLINE
INSTRUCTION METHODOLOGIES
FOR THE
DTIC TRAINING PROGRAM

Prepared By

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OFFICE OF PERSONNEL MANAGEMENT
WORKFORCE EFFECTIVENESS
AND DEVELOPMENT GROUP

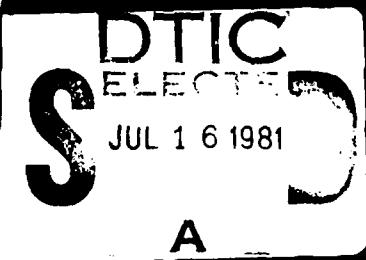
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The author is deeply indebted to the developers and managers of the online instruction programs discussed in the report. These individuals are identified in the text of the report. They willingly and helpfully shared their experiences, and in many cases their tutorial materials, with the author. Without their assistance, the report could not have been produced.

EXECUTIVE SUMMARY

This report presents the results of a study of various instruction methodologies currently in use to teach people how to access and search computer-stored bibliographic-type databases in an online mode. The study was performed to provide DTIC management with information about practices and experiences for DTIC use in reaching decisions about its future course of action with respect to educating clientele in DTIC's access system and online databases.

Discussions with experts in the online community, including members of the DTIC staff, led to the selection of programs of the following organizations for examination:

- a. Lockheed Information Retrieval Service (LIRS) (2 programs)
- b. University of Denver Graduate School of Librarianship and Information Management (GSLIM)
- c. National Library of Medicine (NLM)
- d. University of Dayton Research Institute (UDRI)
- e. University of Pittsburgh On-Line Training Center (Pitt)
- f. House Information Systems, House of Representatives (H.I.S.)
- g. Congressional Research Service, Library of Congress (CRS)

as well as DTIC for comparison purposes.

A set of criterion variables was developed by which the instruction programs were analyzed and compared. These variables address four major areas:

- 1. Purposive documentation
 - goals, objectives, criteria
- 2. Education program
 - components, duration(s), availability, location(s), participants
- 3. Resources
 - human, equipment, facilities, instruction materials
- 4. Evaluation/Feedback Mechanisms
 - instruments, tests, follow-ups, user groups

Most programs are found to be weak in purposive documentation that limits the bases on which their developers can evaluate their accomplishments. Five of the programs rely on lectures as the principal mode of knowledge transfer. Pitt and H.I.S. programs integrate lecturing with hands-on practice. LIRS's ONTAP and CRS programs provide online self-instruction. Four of the programs have a multi-course structure, offering one or more advanced courses beyond an introductory one. No course other than the academic one (GSLIM) is longer than one week in duration. Only LIRS's ONTAP program is substantially location independent; all others require students to travel to either a single location or one of several locations. Although six of the courses have no course fees, the high indirect costs of travel probably prevent some individuals needing instruction from obtaining it.

Approximately 1 to 1½ months appears to be needed by an instructor to plan a program and prepare printed instruction materials for each content focus, i.e., a command language or a database. Preparation time for two or more foci appears to be cumulative, for example, 2-4 months for a command language and a database. Complex databases require more time, for example, 3 months for a UDRI manual. Time needed to revise a program and its instruction materials can vary from 3 days to 1 month dependent on the extent of the revision. By comparison, instructors can spend 10 to 100 hours to prepare one hour of computer-assisted instruction.

No "best" student/instructor ratio for online instruction is yet known. Ratios of the programs studied vary from 3/1 to 20/1, but they are based on the number of terminals available for hands-on practice. Only the Pitt, ONTAP, and CRS programs provide each student with a terminal; in most other programs, two people share a terminal. Irrespective of the instruction methodology employed, all programs produce printed materials for students. These vary from very brief guides to a database and retrieval options (H.I.S.) to replicas of entire lecture content (NLM).

Six of the programs distribute questionnaires to students at the end of a program to obtain a course evaluation. No program has a longer term evaluation mechanism, for example, a follow-up six months after the course. The customer service desks maintained by LIRS, DTIC, NLM, and H.I.S. provide feedback to instructors, but only for NLM is this direct since NLM instruction staff also perform service desk duties. The user group meetings of DTIC and NLM and the update sessions of LIRS are other opportunities for feedback.

No one methodology can be judged better than the others since they differ in purpose, command language, databases, and target audiences. Printed manuals or workbooks appropriate to client needs are seen as essential for at least post-course on-the-job reference. The lecture mode of knowledge transfer is by no means obsolete, but it is recommended that other media be incorporated with it when they can more effectively convey information. For example, slide/tape and videotape modules exemplify the "one picture is worth a thousand words" adage. These visual/sound media could be components of lectures and/or offered for self-paced instruction. Hands-on practice is a sine qua non for these instruction programs. Practice totaling 4 to 5 hours per student is suggested for programs having the objective of providing the student with proficiency to do online searches on-the-job for themselves or end-users.

CRS's computer-based instruction (CBI) program demonstrates that the CBI methodology can be used to convey introductory-level knowledge of a command language and databases. CBI is not yet hospitable to teaching advanced search complexities. It is also expensive. The LIRS ONTAP approach, that uses computers in a more limited way, is worthy of further study. It is self-instructional and, with proper printed materials, it might be able to effectively replace up to 85% of present instruction programs.

INTRODUCTION

The study that is the subject of this report was commissioned by the Defense Technical Information Center (DTIC) because of the confluence of at least three factors:

- (1) a managerial interest in periodically reviewing DTIC's instruction program for its online clientele for adequacy and appropriateness,
- (2) growth of the pre-October 1980 demand for instruction that was beginning to overload the resources DTIC had allocated to the instruction activity,
- (3) commencement of dialup online access to DTIC's databases in October 1980 that was expected to introduce greater demands for instruction from a more heterogeneous clientele.

DTIC personnel responsible for customer service are members of the by now sizeable "online community." This community consists of

- "database producers" or "suppliers", organizations that produce databases in machine (computer)-readable form,
- "database vendors" or "search services," organizations that purchase or otherwise acquire the machine-readable databases, store the databases in a computer system that they maintain, and make the databases available to user organizations,
- "user organizations," organizations that gain access to the vendor-stored databases through purchase or some other arrangement and have a client or customer relationship with the vendor,
- "communications utilities," organizations that maintain networks that link user organizations' terminals to vendors' computers,
- organizations of many types, including higher education institutions, consultant groups, individual consultants, and library consortia, that offer education programs to enable the users to effectively use the computer-stored databases,
- publishers and authors who perform a documentation and communication service for the community.

A considerable amount of functional overlap may exist within a particular

organization. For example, database producers are increasingly undertaking the task of providing users with one or more education/training courses. DTIC is an illustration of a database producer that is also a vendor. All vendors provide, directly or through a contractor, some level of education to actual and prospective users.

The various education programs currently being offered reflect the offeror's judgment about the needs of their user groups and their education responsibility to these groups. Sometimes, perhaps frequently in the case of database producers, the education program represents a compromise between no program and a greater level of effort that the database producer cannot afford.

The use of computer-stored databases is becoming increasingly complex for users primarily because of the increasing numbers of databases and vendor systems that are becoming available. Most databases that had been produced in printed form are now also in machine-readable form and stored in one or more public access systems. To be sure, some of the databases (e.g., those of the Chemical Abstracts Service and the BioSciences Information Service) are structurally complex and subject knowledge facilitates use in the printed or online mode. Aside from inherent file content complexity, the growing need of users to make selection determinations from among available databases imposes a new level of difficulty. Vendors are perceiving the need to provide instruction about databases applicable to particular subject areas. At least some database producers appear to be reassessing their educational level of effort because, if users lack sufficient knowledge about a database, they may ignore it in preference to one or two others they are familiar with despite their unsuitability to the information need. Since payments for use (i.e., fees, royalties) are becoming a significant source of income for database producers, some are beginning to make greater investments in education programs.

Most database producers and vendors have chosen to develop an in-house course preparation and teaching capability. A few producers are obtaining

part or all of their education programs through contracts. Staff ceilings and Office of Management and Budget Circular A-76 Revised (March 29, 1979) are turning many federal agencies including DTIC to investigate the private sector option for the performance of particular activities.

This study has examined eight instruction programs in addition to DTIC's to give DTIC management information to use in reaching a decision on its future course of action with respect to educating clients in the utilization of DTIC's online system and databases.

STUDY OBJECTIVES

An interagency agreement was established between DTIC and the Office of Personnel Management, Workforce Effectiveness and Development Group, for performance of the instruction methodologies study by an OPM specialist. The author is a member of the online community who has participated in developing and teaching a quarter-length course in an accredited library school.

The agreed study objectives are:

- a. To identify, analyze, and evaluate training programs that utilize different modes of instruction to determine the mode or combination of modes most productive and cost effective for DTIC's future training programs for users of the Defense On-Line System (DROLS).
- b. To review implications of the instruction methodologies for DTIC consideration in formulating and implementing future education programs.

DTIC identified particular types of education methodologies and training programs that were of interest. These were:

- computer-assisted instruction
- programmed texts
- contractor-supplied training
- audiovisual modules
- self-teaching modules
- lecture augmented by printed materials
- beginner/advanced/refresher modules

Within fund and investigative time constraints, it was agreed that up to 8 programs that exemplified the foregoing methodologies or combinations of them would be reviewed, compared to the extent possible, and assessed for applicability to DROLS.

STUDY METHODOLOGY

The initial phase of the study focused on selection of the programs to be reviewed. Preliminary inquiries were made by telephone about programs known to DTIC personnel and the investigator. These inquiries sought information about the methodologies employed. In several instances it was found that a reputation for use of a methodology other than the lecture mode was in error. Telephone inquiries were also made to several major library consortia, library schools, and consultants to "brainstorm" for candidate program selection. Where uncertainty was expressed about the nature of a program, follow-up telephone calls were made.

It became apparent that the lecture mode of teaching the use of online databases is sufficiently pervasive that a modification of the study plan had to be introduced. The initial expectation was that many methodologies could be found in a relatively "pure" form, that is, used by themselves not in combination with others. It was decided to accept programs that used either one methodology or one predominantly or a variety of methodologies such that the methodological novelty resided in the mix being used. Although the lecture mode is pervasive, it was instructive to find that lecture alone is being phased out as an instructional methodology.

Accordingly, the following programs were chosen for review:

- for computer-based instruction (CBI, frequently used interchangeably with "computer-assisted instruction" or CAI)
Congressional Research Service (CRS)'s SCORPIO program
- for an integration of several media and for a contractor-supplied program
University of Dayton Research Institute (UDRI)'s FTD program
- for a self-instruction program
Lockheed Information Retrieval Service (LIRS)'s ONTAP program

- for learning predominantly through a hands-on practice program
House Information Systems (H.I.S.)'s multi-database program
- for a 50/50 lecture/hands-on program
University of Pittsburgh On-Line Training Center (Pitt)'s program
- for a reasonably typical lecture-based academic program
University of Denver Graduate School of Librarianship and Information Management (GSLIM)'s course
- for a mostly lecture-based training program
LIRS's seminar programs
- for a federal agency analog to DTIC's DROLS program
National Library of Medicine (NLM)'s MEDLINE program

Additionally, like DTIC, CRS, H.I.S., and NLM are database producers.

Like DTIC, CRS, LIRS, H.I.S., and NLM have a vendor or vendor-type relationship with user organizations. Other methodological characteristics of these programs are discussed in the next section headed *Study Findings*.

Contact persons for the programs were identified and telephoned. All individuals expressed a willingness to be interviewed and to share their education program experiences with the investigator.

In all instances, information about the programs was obtained by interview. Interviews were conducted at the education sites for all organizations except LIRS. The investigator had attended two of LIRS's recent programs. For LIRS, the contact person was interviewed by telephone. For the interviews, an interview schedule was developed, field tested, and modified. The final schedule is shown in Appendix A. In most instances, the interview schedule was sent to the contact person before the interview was held. In all instances, contact persons were called on one or more occasions after the interview for additional or verifying information.

To comparatively analyze the information collected, a set of program characteristics or features was developed. These appear in the left column

of Table I (page 68). From an evaluation methodology viewpoint, these characteristics can be used as criterion variables.¹ They are employed in this study as the basis for a comparative analysis and assessment of education programs and methodologies. It should be noted that assessments do not have to be value loaded (i.e., good, bad). Rather, assessments can identify presence or absence, or degree of presence, without a value judgment. Alternatively, the characteristics can be value loaded. For example, an evaluator may predetermine that a student/instructor ratio in the range of 3 to 5 is excellent, 6 to 9 is very good, 10 to 15 is acceptable, etc. When ratio data are collected for particular programs, they can be rated in terms of the pre-established scales.

A departure from the original study methodology was introduced about a month after the study commenced. It had been desired to obtain assessments of the effectiveness of education programs from student participants. It began to become evident that systematic access to student recipients of various programs was not readily attainable. Consequently, a substitute approach to student information was attempted with a questionnaire. The 3-page questionnaire is presented in Appendix A in photoreduced form. The questionnaire was promoted and distributed by the investigator at two sessions of the Annual Meeting of the American Society for Information Sciences in October 1980 and at a meeting of the On-Line Users Group in Washington, D.C. It was also disseminated by the University of Dayton and the University of Pittsburgh contact persons in their respective locations. The total return was 16 questionnaires of about 120 distributed, a disappointing 13%.

Information from the interviews and the questionnaires was aggregated and analyzed. During the interviews, contact persons were asked for copies of their training materials. Not all training materials were obtained (e.g., Chemical Abstracts' ONTAP materials). Available materials were examined as part of the analysis to produce this report.

STUDY FINDINGS

This section is subdivided into two parts. The first part presents brief descriptions of the instruction programs selected for examination. The second part contains an assessment of the programs oriented to assist a manager in reaching a decision about appropriate methodologies for his/her organization's clientele and databases.

FINDINGS, PART I - INSTRUCTION PROGRAM DESCRIPTIONS

Information for each of nine programs is presented in the following format:

Type of Instruction
Principal mode of delivery
Auxiliary modes of delivery
Organization providing instruction
Name and address
Contact person(s)
Telephone
Type of organization (i.e., public, private, vendor, database producer, etc.)
Recipients of instruction
Class size(s)
Location(s) of instruction
Frequency of offering/availability
Brief description of nature of instruction
Improvements desired/planned
References

Additionally, for several programs, a section entitled Background has been inserted immediately before Brief description of nature of instruction. For these programs, it was believed important to understand to include either the historic development of the program or information about the databases taught in the program.

For the last data entry, References, citations are given for reports and/or published papers given to the investigator by the contact person. No literature search about the programs was conducted.

The program descriptions are presented in this section by a Type of Instruction arrangement. The order is from the more traditional instruction methodologies to the newer methodologies. By organization, the pages that follow contain descriptions for the programs of:

Lockheed Information Retrieval Service (LIRS)

University of Denver Graduate School of Librarianship
and Information Management (GSLIM)

Defense Technical Information Center (DTIC)

University of Dayton Research Institute (UDRI)

University of Pittsburgh On-Line Training Center (Pitt)

House Information Systems (H.I.S.)

LIRS ONTAP

Congressional Research Service (CRS)

The current program of DTIC is included to provide a baseline for DTIC management.

Type of Instruction

Principal mode of delivery: Lecture

Auxiliary modes of delivery:

For introductory course: Printed workbook,

Online demonstrations,

Online practice

For subject seminars (advanced courses) and refresher:

Printed workbook

For updates: Sample searches handout

Online demonstration

Organization Providing Instruction

Lickehead Information Retrieval Service (LIRS)

3460 Hillview Avenue

Palo Alto, CA. 94304

Instructors

Sophie K. Hudnut, DIALOG Training Coordinator

Staff of instructors, number not disclosed

(415) 858-3810; (800) 227-1927 (except CA); (800) 982-5838 (in CA)

Type of Organization

commercial online services vendor

also contractor supplying instruction

Recipients of Instruction

primarily DIALOG users and prospective users; no restrictions

Class size(s)

Introductory course: up to 12

Subject seminars: up to 25

Refresher: up to 25

Updates: up to 50

Location(s) of Instruction

Introductory course: field offices, major cities in U.S.

Refresher, subject seminars: same as above

Updates: frequently in a city back-to-back with a major professional society meeting

Also customer locations, see Brief Description below

Duration(s) of Instruction

Introductory course: 1½ days

Advanced chemical: 1 day

Subject seminars, refresher: ½ day

Updates: 2 days

Frequency of Offering/Availability

Introductory course: almost weekly at Palo Alto, Chicago, New York, and Washington, D.C. field offices

several times per year in each of most major U.S. cities

Subject seminars, refresher: 8 per quarter nationwide, thus each offered about 3 times per year somewhere in the U.S.

Advanced chemical:

Updates: 2 to 3 annually

Brief Description of Nature of Instruction

This instruction program focuses solely on one commercial vendor's access system, Lockheed's DIALOG, and on the databases available through the system. If it can be said that there is an "official" instruction program for DIALOG, this is it since the program is produced and provided by DIALOG staff.

LIRS's position on instruction has changed since DIALOG first went public. It was initially thought that education programs would be developed by educational institutions and database producers. The very slow entry of these organizations into the education/training field, customer need for training, and LIRS receptivity to providing assistance gradually brought LIRS to its present position of taking responsibility for training in the use of its system and for providing at least an introductory understanding of its databases.

Five categories of instruction are provided:

- (1) an introductory course called "System Seminar"
- (2) a refresher course called "System Refresher"
- (3) advanced courses called "Subject Seminars"
- (4) one more intensive advanced course called "Advanced Chemistry"
- (5) updates that LIRS doesn't classify as courses but are tutorial

The System Seminar gives reasonably well balanced instruction in (a) the access language (DIALOG), (b) search strategy and tactics, (c) database structure, and (d) integration of these elements. Illustrative uses of the access language and illustrative search problems demonstrate the content of a variety of databases and retrieval possibilities from them. Considerable

emphasis is given to strengths and pitfalls of various search strategy specifications. In the workbook that students keep, various aspects of search outcomes are highlighted and annotated.

The amount of hands-on practice that students receive in the introductory course varies with the availability of terminals at the course location. About 3 to 4 hours of online time are allocated per course. When it is given in Palo Alto with 6 terminals available, each student may receive up to 1 hour of practice (individuals working at the different terminals simultaneously). When a single terminal is available, each student may receive only 15 minutes of practice; some may get less. When the course is given at a customer's location (see below), the amount of practice is determined by the amount of time the customer pays for.

LIRS currently offers 14 courses beyond the introductory:

- Subject Seminars in Biosciences, Business, Chemistry, Excerpta Medica, Government Documents, Humanities, Legal Information, Nonbibliographic Databases, Patents, Science/Technology, and Social Sciences
- a Seminar in Search Strategy
- a Refresher Seminar
- an Advanced Chemistry Seminar.

An effort is made to present each of the Subject Seminars and the Refresher in each part of the U.S. (to minimize travel expenses and inconvenience) once annually, although the decision for a particular seminar in a particular location is undoubtedly also determined by expressed customer need. The Seminars have neither online demonstrations nor online practice on the assumption that students have this experience and primarily need a better knowledge of use of various files in a subject field. Each of the workbooks prepared for the seminars presents a discussion of advanced features of DIALOG and annotated illustrations of subject searches.

LIRS will additionally provide any of the training courses at a customer's location for a fee of \$300 for a half day, \$375 for 2 half-days, \$500 for 1½ days, and \$575 for 2 days. LIRS furnishes one instructor per course regardless of the location. Each instructor is a specialist in one or more subject areas. Lately, two or more courses, the Introductory course and a Subject Seminar, are being offered back-to-back at a location to reduce expenses. A salutary aspect of this practice is that a Subject Seminar can be given with fewer than 10 students since the major expense has been covered by the introductory course.

The updates are viewed by Lockheed as opportunities for experienced searchers to discuss problems and strategies among themselves and with LIRS personnel and representatives of database producers. For example, the Fall 1980 Update held in San Francisco before the Online '80 meeting featured 7 subject sessions, each focused around 5 search topics. Arrangements were made for relevant database producers to prepare and discuss the strategies they formulated for the topics. The Update also included sessions about new DIALOG databases, the DIALORDER procedure, and LIRS's private files service; a "What's New with DIALOG?" summary by the DIALOG director; and a database exhibit at which producer brochures were displayed.

Improvements Desired/Planned

The Training Coordinator views education as an evolving process and states that training materials are under continuous review for revision as needed. In September 1980, LIRS announced a major revision in its database documentation ("Guide to DIALOG - Databases"). LIRS is reissuing this publication as separate chapters and it is eliminating preliminary versions of chapters that were heretofore distributed as separates until a sufficient number of chapter texts could be assembled for a looseleaf volume of the "Guide."

In 1980, several new Subject Seminars were introduced and the pattern is likely to continue in 1981. LIRS courses may also be offered in more locations in the U.S. An item in LIRS's November 1980 newsletter, *Chronolog*, encouraged DIALOG users to become host institutions for DIALOG courses. An inducement is two free registrations for each seminar hosted or an equivalent amount of connect-time credit. The items specified the need for three telephone lines (for 3 terminals) for the Introductory course.

References

"DIALOG System Seminar"

"Chemical Information Seminar", "Business Seminar," etc. for each subject seminar

"Guide to DIALOG Searching"

"Guide to DIALOG - Databases" - looseleaf set of chapters, each averaging about 30 pages and providing a field-by-field description of the database as stored in the Lockheed system with several sample searches

"Chronolog" monthly newsletter

Bluesheets, two page summaries of the contents of fields of each database

Type of Instruction

Principal mode of delivery: Lecture

Auxiliary modes of delivery: Printed material,

Online demonstration,

Hands-on practice

Organization Providing Instruction

University of Denver (GSLIM)

Graduate School of Librarianship & Information Management

Denver, CO. 80208

Instructors

James K. Foyle, Anindya Bose (Rowena W. Swanson to March 1980)
(303) 753-2557

Type of Organization

private, non-profit, academic institution (graduate school)

Recipients of Instruction

graduate students in library/information science

Class Size

20 to 40

Location of Instruction

classroom and terminals laboratory

Duration of Instruction

9 to 11 weeks (4 hrs/wk lecture, 2-5 hrs/wk lab)

Frequency of Offering/Availability

quarterly

Brief Description of Nature of Instruction

This description pertains to instruction that was provided in 1979 and early 1980. Except for the amount of hands-on practice time allocated to students, the methodology is typical of academic instruction programs of the time. It is believed that university programs are increasingly providing the level of hands-on practice available at GSLIM and perhaps more.

The program presented instruction in two systems, Lockheed's DIALOG and SDC's ORBIT. In both instances, all features of the command languages

were taught. Contents of databases were not taught on the assumption that students obtained information about some of them in earlier courses. Database design and loading into the respective computer systems were explained in relation to their effect on search strategy development and retrieval. Most lecture periods included extensive online demonstrations of features selected by both the instructor and students. Within limits, demonstrations were performed by students as well as the instructor. Printed manuals distributed to students contained illustrations of online sessions that were used when computer systems went down.

Student performance was monitored by written tests, one for each system, and by search results obtained for 3 projects. Two projects involved 2 or 3 person teams who selected their search questions from a collection of real inquiries obtained from local area libraries. The third project was an individual one chosen by the student and approved by the instructor. Students selected 2 or 3 of the databases most appropriate to the search question to search. Neither classroom demonstrations nor student practice was restricted to one, two, or a few files. Students discussed their search results and problems encountered in the projects in class so that various experiences could be shared. A total of three 30 to 40 minute online practice periods were allotted to each student for project work.

The laboratory is equipped with 3 keyboard-CRT-printer terminals of different manufacturers for breadth of experience. It also contains most of the manuals, thesauri, and search aids that have been published for online databases, including materials for systems not taught during the course (e.g., MEDLARS). Students typically would spend 2 to 4 hours of their own time weekly in the laboratory working with the materials for their projects.

Improvements Desired/Planned

Most student requests were for additional hands-on practice.

Faculty desired additional terminals (at least two) of different

manufactures to give students broad experience for the job market. Existing terminals operated at 300 baud. At least one 1200-baud terminal was wanted.

To provide reasonably thorough comprehension of all -- not only the basic -- elements of the DIALOG and ORBIT command languages, no reduction in exposure time to the systems was deemed possible. Nevertheless, faculty wanted to provide learning opportunities for the BRS system and the New York Times Information Bank; MEDLINE is briefly presented, without hands-on practice, in a medical bibliography course.

No funds were available for additional equipment or online time. Some thought was given to providing instruction on other systems in short-course formats (1-2 weeks of intensive instruction and practice with a different pricing structure). Advanced short-course instruction that might focus on subject areas and databases for them was also being considered for future development.

Type of Instruction

Principal mode of delivery: Lecture

Auxiliary modes of delivery: Hands-on practice,
Printed materials,
Flip charts

Organization Providing Instruction

Defense Technical Information Center (DTIC)

Defense Logistics Agency

Cameron Station, Bldg. 5

Alexandria, VA. 22314

Instructor

James de Persis

(202) 274-7206

Type of Organization

public, federal agency, database producer

Recipients of Instruction

For dedicated system: 85% federal agencies staff,
15% DOD contractor personnel

For dialup system: same as above, 70% contractor personnel expected,
mix of clerical, library, sci/tech staff members

Class Size

8 to 10

(50 people in a 2-day dialup session in Los Angeles in December 1980)

Location(s) of Instruction

Training room in DTIC

Training facilities provided by organizations in the field

Duration(s) of Instruction

For dedicated system: Introductory course: 5 days (majority of courses)
8 days, 10 days (rarely)

Intro. in field: 5 days

Intermediate course: 3 or 5 days

None held in field through 1980

Advanced course: 3 days

None held in field through 1980

For dialup system: Introductory course: 2, 3, or 5 days planned
(instruction commenced in late 1980)

Frequency of Offering/Availability

For dedicated system: Introductory: at least one monthly at DTIC

In field when number of requests warrants expense

Intermediate, Advanced: on an as requested basis,
as number of requests reaches 6 to 10

For dialup system: Pattern not yet established

Background

DTIC produces five databases:

a. Technical Reports (TR) file

Contains bibliographic data; abstract, subject terms, and copy prices (DD Form 1473 information) for scientific and technical reports produced by DOD agencies and their contractors. The online file contains surrogate information for documents acquired by DTIC during the past 10 years. (Information for documents acquired earlier is not maintained online.)

b. Current Technical Reports (CF) file

Contains DD1473 information for documents to be announced in the next issue of the DTIC publication, Technical Abstracts Bulletin (TAB). After publication of the TAB issue, the data are transferred to the TR file.

c. Work Unit Information (WU) file

Contains management and technical status data (DD Form 1498 information) for activities being performed in DOD Research and Development programs. A "work unit" is the smallest segment into which R&D efforts are divided; for example, a DOD project may consist of a set of tasks each of which is composed of several work units. The WU file is a "full text" file in the sense that it contains all of the information reported on DD1498; this includes agencies and individuals doing the work, contract/grant and funding data, a description of work objectives and content, subject terms, identification numbers (program element, etc.), and security limitations.

d. Program Planning (PP) file

Contains management, fiscal and technical status data (DD Form 1634 information) for DOD R&D programs at the project and task levels.

An R&D "project" consists of one of several related tasks directed to the development of equipment, systems, components, techniques, or

to the exploration of a new field of knowledge. The PP is a "full text" file in the sense that it contains all of the information reported on DD1634; this includes agencies and individuals engaged in the project, fiscal data and fund resource projections, a description of work objectives, plans, and progress, identification numbers, and security information.

e. Independent Research (IR) file

Contains planning and technical information for non-DOD sponsored projects that private organizations voluntarily report to DOD on DDC Form 271. The projects are within DOD R&D areas of interest. They are components of corporate research programs directed toward the development of future technologies, systems, and hardware. The data are proprietary and exempt from disclosure under the Freedom of Information Act, subsection (b), 5 USC 552. The file is accessible only to DOD and other federal agencies that have been certified to use it. Certification is further limited to need-to-know fields of interest and appropriate security classifications.

Instruction on the IR file is only included in the 10-day Introductory course. Participation is limited to individuals and agencies that have received the necessary access certifications.

Brief Description of Nature of Instruction

Until the Fall of 1980, the number of organizations that used DTIC's online databases was limited to approximately 100 because they had to obtain direct line access (dedicated terminals). Only UNIVAC 100 or 200 terminals were appropriate. In October 1980, dialup access became available for which there are no terminal restrictions. This expansion of databases availability is expected to significantly increase the demand for all levels of instruction.

For direct line clients, the training methodology in DTIC's Cameron Station facility consists of lecture extensively alternated with hands-on practice. Three keyboard-CRT-printer terminals are in the training room. The instruction pattern is to subdivide each morning and afternoon into lecture

and online segments. Both lecture and student preparation for practice require frequent reference to DTIC's printed search aids. The instructor provides sets of 8 to 12 questions that are to be searched for each practice session. Online practice is performed by 2 or 3 person student teams; the individuals take turns at the keyboard. Students use the approximately 20 feet of chalkboard in the room to record results of some of the searches that are then discussed at the beginning of the next lecture period.

The 5-day Introductory course is the most often given. It covers the command language and the TR and WU databases. The 8-day course adds instruction for the PP database. The 10-day course includes the IR database; it is infrequently held because of the limited clientele for this file.

The Intermediate and Advanced courses have only been presented at DTIC's facility. The Intermediate course has been held for students of the 5-day Introductory course. The 3-day Intermediate course covers a review of the TR and WU databases and training in the PP database. The 5-day Intermediate course includes the IR database. The Intermediate course is thus primarily a time extension of the Introductory course.

The 3-day Advanced course is held mainly to provide instruction on changes and enhancements to the system. For example, the Advanced course most recently held covered text searching that was introduced into the system in 1979. Additionally, the course is a forum for user questions and problems.

Only 5-day Introductory courses have been held for direct-line clients in the field. The coverage is essentially the same as for the course at DTIC except that only one terminal is typically available for hands-on practice rather than DTIC's three.

Instruction for dialup clients held through December 1980 introduced modifications. The duration for the Introductory course was shortened to 2 or 3 days and most of the hands-on practice was eliminated. In the only experimental 3-day course held, only the command language and a limited

explanation of the TR, WU, and PP databases were covered with no hands-on practice. At a 2-day dialup course in Los Angeles, 50 people arrived for training; only 2 terminals were available and no screen monitors for audience viewing of demonstrations.

All students are given certificates regardless of whether they attended a 10-day or a 2-day course. Students complete a DDC Form 345, a course evaluation form, that is anonymous. About 50% of the forms are estimated to contain constructive information. The current teaching format of half lecture, half practice each morning and afternoon emanates from student requests. The organization of the October 1980 "Self-Training Manual" also incorporates student recommendations that instructional text be arranged by database rather than by system commands. Parenthetically, this text is designed to assist individuals who have taken DTIC's courses to train other personnel in their organization who will not be taking DTIC's courses.

Improvements Desired/Planned

DTIC is planning a major revision in its training programs. It commissioned a study of training methodologies to obtain data for a decision on its future training program strategy.

The dialup service is likely to appreciably increase client demand for training. Since the DTIC system can separate access to the classified portions of its files from the unclassified, and since the WU and PP databases are not available from any other online service, popularity of these files can be expected to grow. (The unclassified portion of the TR file is contained in the database of the National Technical Information Service that is publicly available.) It is also anticipated that the dialup clientele will differ to some extent from that for direct-line service. Dialup users will probably consist mainly of private-sector organizations with a greater heterogeneity of information needs.

DTIC conducts five annual user group meetings, four at regional loca-

tions (e.g., California, Midwest, Florida, Northeast) and one at DTIC in the Fall. Attendees at the October 1980 DTIC meeting strongly recommended that one day of advanced training be held as part of each regional meeting program. Implementation of this recommendation is planned. Coverage will include discussions of user experiences and problems as well as information about system changes.

References

"Self-Training Module for Users of the Defense RDT&E On-Line System," September 1979.

"Self-Training Manual for Users of the Defense RDT&E Diverse Dial-Up On-Line System," October 1980

"Defense RDT&E On-Line System, Retrieval Mini-Manual," December 1979.

Type of Instruction

Principal mode of delivery: Lecture

Auxiliary modes of delivery: Computer-based instruction,

Workbook,

Hands-on practice,

Other printed materials

Organization Providing Instruction

National Library of Medicine (NLM)

Bibliographic Services Division

MEDLARS Management Section

8600 Rockville Pike

Bethesda, Maryland 20014

Instructors

Four full-time staff (including Patricia E. Healy and Sheila Proudman who were interviewed) and one half-time person of the MMS
(202) 496-6193

Type of Organization

federal agency, database producer

Recipients of Instruction

Users or prospective users of MEDLINE and other NLM online databases

Class Size(s)

Introductory called "Initial Training": 18 to 20 maximum

Abbreviated Initial Training: 50

Advanced Training: 18 to 20 maximum

Update: 20 (primarily Technical Resource Persons from regional offices)
(Update not considered training by NLM staff)

Location(s) of Instruction

Initial and Advanced Training: NLM, NLM's Regional Medical Libraries

Abbreviated Initial Training: NLM

Updates: NLM

Duration(s) of Instruction

Initial: 5 days

Abbreviated Initial: 3 days

Advanced: 5 days

Update: 1½ days

Frequency of Offering/Availability

Initial: monthly at NLM; quarterly at an RML

Abbreviated Initial: 4 per year planned for 1981

Advanced: 6 to 7 times per year at NLM, 6 to 7 times at an RML

Update: annual

Brief Description of Nature of Instruction

NLM has been training researchers since MEDLARS (Medical Literature Analysis and Retrieval System) was first automated in the mid-1960's as a batch system. An initial 8-month training program was progressively shortened to 6 and then to 2 months. When MEDLINE (MEDLARS On-Line) was activated in 1971, the training program was redesigned and reduced to 3 weeks. A change to the present format was instituted in March 1977. The present format consists of:

- a. Self-instruction with MEDLEARN, a CBI program
- b. Initial Training, 1 week lecture + workbook + hands-on practice
- c. Self-administered test after 6 or more months
- d. Advanced Training, 1 week lecture + workbook + hands-on practice
- e. Updates

Additionally, NLM presented one Abbreviated Initial Training session of 3 days in 1980 that did not include hands-on practice. Because it was well received, 4 Abbreviated Initial sessions are scheduled for 1981.

MEDLEARN was originally developed by the George Washington University Medical Center under contract to NLM. This computer-based instruction (CBI) program is currently being modified and maintained in-house. Trainees receive an instruction kit and a special password for free use of MEDLEARN 6 weeks before an Initial Training course begins. They are expected to gain initial familiarity with logging on and off and with rudimentary aspects of the system before they arrive. Staff of the MEDLARS Management Section provide such augmenting assistance as may be needed by telephone. Most (but not all) of the fright of terminals is overcome before the trainees arrive for the Initial Training course.

Organizations that wish to use MEDLINE must send at least one person to NLM for training. The organization does not get an account number until one person has received training. However, because of class size limitations, only one person from an organization may attend a course at any one time.

Both the Initial and the Advanced Training courses are held in a classroom in the new Lister Hill National Center Building. The classroom is equipped with 10 TI Silent 700 terminals; there are no CRTs or TV monitors. The instruction methodology consists of a combination of lecture, referral to workbook and other handouts, and use of the terminal. Two students are assigned to a terminal. The workbooks for each of the courses is detailed and voluminous (approximately 300 pages each). They have been designed to encompass the classroom content so that students can devote their attention to the instruction rather than feel compelled to take copious notes.

Trainees are expected to gain at least 6 months of work experience before applying for the Advanced course. When they apply, they receive a pretest. The current pretest consists of 10 pages of detailed questions about use of the command language and various databases plus exercises to be performed online using MEDLINE, CANCERLIT/CANCERPROJ, and CHEMLINE. The pretest responses are brought to the Advanced course and discussed on the first day. The pretest serves as a screen to preclude attendees without the requisite knowledge.

Many different types of organizations, not only medical schools, hospitals, and research institutions, have become users of MEDLINE. Over 1200 unique institutions are now users and about 2000 passwords have been issued. Because of the heavy demand for training, NLM tried an Abbreviated Initial course for 50 people in 1980. Of 3 days duration, it is held in an auditorium-type room and does not include hands-on practice. The acceptance of the course by attendees has led NLM to schedule 4 for 1981.

NLM issues certificates to trainees, and trainees receive Continuing Education (CE) credits from the Medical Library Association. The credit allocations are:

Initial Training: 3.5 CE

Advanced Training: 3.5 CE

Auditor of either of above (no hands-on practice): 2.0 CE

Abbreviated Initial: 2.0 CE

Abbreviated Advanced: 2.0 CE (see below)

Credit is given only for courses taught by NLM staff or staff authorized by NLM. At present, only one group has been authorized by NLM to provide training, namely the Regional Medical Library at the University of California, Los Angeles. The RML/UCLA teaching staff received its training at NLM and taught at NLM under the observation of NLM staff prior to gaining authorization.

NLM schedules the courses to be taught at RML/UCLA, selects the students, provides the instruction materials, forwards the certificates, and certifies the students to the MLA after training.

Only one update session is conducted by NLM staff. This is a 1½ day briefing primarily for Technical Resource Persons (TRPs) from the eleven regions. TRPs are selected by the RMLs and may be either members of RML staffs or from an educational institution in the region. Updates introduce TRPs to new files, file designs, changes in the MESH vocabulary, and anticipated system modifications. NLM produces printed update material and gives 150-200 copies to each TRP. Each TRP is expected to conduct at least one 1-day update in his/her region annually at which NLM's material is distributed. TRPs and the RMLs are free to conduct additional training courses of their choosing.

NLM courses are limited to NLM system users. Some NLM databases are available from Bibliographic Retrieval Services, Inc., and Lockheed Information Systems announced the forthcoming availability of some databases.

Although in actuality many BRS users are also NLM users, NLM has not serviced

users solely with the BRS system and does not plan to service solely Lockheed users.

Improvements Desired/Planned

Success of the Abbreviated Initial course, described above, has led to a decision to offer this course quarterly in 1981. Additionally, it is planned to offer an Abbreviated Advanced course at least once in 1981 to test audience acceptability. However, presentation of the Abbreviated Initial course indicated the desirability of including online demonstrations observable on TV monitors during the lecture sessions. It is planned to incorporate this teaching methodology in all Abbreviated courses offered in 1981.

NLM suspects that, with the diversity of user organizations, a single Advanced course may be less needed than a series of advanced one-day workshops, each centered on a particular subject area. An Advanced course format that groups content in such a way as to permit attendees to select topics and days most appropriate to them may be developed and offered in 1981.

Some thought has been given to grouping trainees to create more homogeneous groups and thus perhaps improve learning for all. Some trainees exhibit "terminal phobia;" separate classes for them might permit a faster teaching/learning rate in other classes. Trainees from different user organizations, for example, hospital libraries, research laboratories, chemical companies, have different needs and expectations. It is thought that grouping by type of user organization might also improve teaching/learning effectiveness.

A redistribution of workload in the MEDLARS Management Section may occur in 1981. This may result in assigning 2 staff members full-time teaching responsibility and giving part-time responsibility to 1½ others. At present, each person in the MMS is responsible for correspondence from a region and each takes turns at the user service desk.

NLM staff are not expecting to give courses in the field in 1981. They have a very limited travel budget, and they are not permitted to accept payment

from user organizations to defray travel costs. Heretofore, field courses were given by two staff members. It is felt that this causes too much of a mental and physical drain on the instructors. For courses given at NLM, system and subject specialists are brought in to teach their specialties, thus relieving the regular instructors from continuous teaching for intervals of time.

NLM may increase the number of organizations authorized to teach NLM courses. The RML at the University of Nebraska is presently under consideration, and perhaps one or two additional RMLs will receive authorization.

In a periodical paper, NLM staff announced a future availability of a CBI program called TOXLEARN. Work on this program was discontinued because of staff shortages. It is not certain whether work on TOXLEARN will be resumed in 1981.

A CBI program called CHEMLEARN has been written and is now being evaluated. No date for release to users has been set.

MEDLEARN at present is only available to users at particular times and this may also be the pattern for CHEMLEARN. CHEMLEARN probably requires more computer capacity than MEDLEARN. It is the capacity requirements of these CBI programs that limit their availability. However, in 1980, NLM replaced its IBM 370/158 with a 370/168 and at the close of 1980, new storage units were installed. This may facilitate the availability of the CBI programs.

References

"Course Workbook, Initial Online Training Class"

"Course Workbook, Advanced Online Services Training"

"MEDLEARN" (i.e., instructions on how to access MEDLEARN)

"Online Services References Manual," 1980

Laura J. Eisenberg et al., "MEDLEARN, A Computer-Assisted Instruction (CAI) Program for MEDLARS," Bull. Medical Library Assn., vol. 66, no. 1 (Jan. 1978) 6-13.

Laura Kassebaum & J. Leiter, "Training and Continuing Education for On-Line Searching," Medical Information, vol. 3, no. 3 (1978) 165-175.

Type of Instruction

Principal mode of delivery: Lecture

Auxiliary modes of delivery: Slides,

Workbooks,

Hands-on practice,

Supplementary printed materials

Organization Providing Instruction

University of Dayton Research Institute (UDRI)

Kettering Engineering & Research Labs.

Room 445

Dayton, Ohio 45469

Instructors

J. Kirk Brashear, Project Director

Linda M. Swartzel

(513) 229-3711

Type of Organization

public, academic, non-profit institute, contractor-supplied instruction

Recipients of Instruction

Individuals designated by the contractor (Foreign Technology Division, AFSC, Wright-Patterson AFB); backgrounds of recipients have varied from the clerical and paraprofessional to librarian to end-user, a wide range usually present in each class; the typical student is a non-information professional in the GS-4 to -7 range.

Class Size(s)

Introductory course: 8 to 10

Advanced course: 6 to 8

SDI Profiles course: 8 to 12

Location of Instruction

two adjacent rooms at the UDRI

Duration(s) of Instruction

Introductory: 3 days (Tuesday-Thursday)

Advanced: 1½ days

SDI Profiles: 1½ days

Frequency of Offering/Availability

Introductory: monthly

Advanced: semimonthly

SDI Profiles: semimonthly

The Advanced and SDI Profiles are offered back-to-back, the Profiles course immediately following the Advanced course.

Background

The database (actually a family of databases) for which this instruction program provides access training is called CIRC II (Central Information Reference and Control II). It is the information system of the DOD Scientific and Technical Intelligence Information Support Program (STIISP). The STIISP meets the intelligence information needs of DOD's S&T intelligence production agencies, namely the Naval Intelligence Support Center, the Foreign Science and Technology Center, the Medical Intelligence Information Agency, the Missile Intelligence Agency, and the Foreign Technology Division of AFSC where CIRC II is housed.

Each of the five intelligence production agencies identifies documents for CIRC II and provides the following information for entry into the database:

Document identification and attributes

Geographic content

Temporal content

Personalities, facilities, nomenclature, and interrelationships

Subject content

The database is subdivided into an unclassified portion, currently available online during the morning (0830 to 1315 EDT, M-F) and a classified (or secured) portion, currently available online in the afternoon (1400 to 1700 EDT, M-F). The database is subdivided into several subsets. Included among those available mornings are the following:

PFLN Files (Personality, Facility/Organization, Location, Nomenclature)

Personality - a file of surnames

Facility/Organization - an index to organizations, facilities, military bases and units, and post box numbers

Location - an index to geographic coordinates, cities and higher geopolitica, geophysical, and geographic areas up to but not including countries, oceans and seas

Nomenclature - an index for materials, system and hardware designations and code names, ship names and classes, space and missile event numbers, aircraft registration numbers, etc.

UPDT - CIRC II records for documents processed during the current year and the previous year

XLAX - index to S&T translations

CREF - cross reference list of CIRC II sequence numbers, original document numbers, and microfiche film numbers

PROL - a library of existing SDI profiles

The UDRI initially developed and provided the instruction programs under a sole-source procurement. Since 1979, it has conducted 18 Introductory courses, 4 Advanced courses, and 8 Profiles courses. In the Fall of 1980, it received a contract renewal under an FTD RFP.

Brief Description of Nature of Instruction

On two counts -- the complexity of the databases to be learned and the heterogeneous mix of students -- this instruction situation differs appreciably from most others. To promote learning, the instructors have devised a methodology that combines the extensive use of slides with lectures and extensive terminal practice.

As indicated in the Background section above, document records contain not only bibliographic information but also a variety of other descriptors used by the intelligence community coupled with several sets of numeric codes. In the Introductory course, students must learn not only an access language (a modified version of IBM's STAIRS) but also the structures of several databases. A measure of volume as well as complexity may be suggested by noting that the PFLN codes for a single symposium or handbook type of document could require 500 lines of printout.

The instructors have no control over selection of the individuals who come for training. This selection is made by the user organizations, 63 in number, that consist mainly of federal intelligence agencies and a few of their contractors (e.g., Battelle Memorial Institute). For some difficult-to-understand reason, the majority of persons sent by the agencies are non-technical and non-professional. This may have some bearing on the turnover that apparently occurs among these individuals, because UDRI has received a constant flow of about 80 people per year for the Introductory course and about 100 people for the Profiles and Advanced courses. Approximately 200 people are active end-users in the 63 agencies at the present time. The instructors see the need for course materials and course content that can promote learning despite wide differences in background and experience among the students.

An additional complexity is the existence of separate classified and unclassified files. As specified above, files containing only unclassified terms are accessible in the mornings and classified files (having confidential, secret, and top secret classifications) are accessible in the afternoons.

The initial thrust in the Introductory course is getting students accustomed to working at terminals. On the first morning after administrative matters are finished, students are seated at terminals and "stepped through" logging onto the system and some simple retrieval. UDRI's teaching facility consists of a classroom with audiovisual equipment and an adjacent terminal room. The terminal room contains 4 Teletype model 40/8's (keyboard, CRT and printer; users more typically have model 40/2's) and could be cramped with 10 to 12 people in it. Because of the limited number of terminals, individuals in 2 or 3 person groups take turns doing and watching.

The general pattern of instruction is to alternate 30-minute sessions of classroom and online practice. At the first terminal session, students are told the keys to press. Thereafter, their practice sessions pragmatically test what they learned in the classroom session.

For security reasons, FTD monitors the online usage of the databases. Records of users' search strategies and online printouts have been given to UDRI for analysis. Some general patterns of search behavior are discernible, but an inability to discuss the strategies with the searchers leaves unanswered questions. One common pattern is the use of simple search strategies, i.e., the failure to take advantage of the retrieval power of codes and Boolean combinations. This may result from the inquiry the searcher has received from the client, but it more likely results from the searcher's limited experiential background and/or an insufficient knowledge of the databases. Another common pattern is an infrequent use of HELP messages. Some feedback indicates that searchers prefer to seek help in the workbooks UDRI has prepared than from online aids. Ms. Swartzel believes the system's error and help messages may be underused because they are in language that is not readily understood.

A significant feature of the Profiles course is the availability of PROL, a database of current SDI profiles. Searchers are encouraged to use this database as an aid in profile development. A separate database, PROM, exists for profile construction and maintenance. The function of PROM is similar to that of SDC's ORBIT database. The command language (and computer program) for profile development was written by BRS (Bibliographic Retrieval Services, Inc.), a commercial vendor that also employs a modified version of STAIRS. Parenthetically, BRS needed 9 months to debug the program that is now being maintained by FTD. The Profiles class assumes a knowledge of CIRC II system commands and strategy formulation and is limited to the development and maintenance of profiles.

Improvements Desired/Planned

A drawback in this program is a relationship between FTD and the contractor that has effectively shut the contractor off from feedback from students. FTD has instructed users to call in-house FTD monitors who have rarely referred callers to UDRI instructors. The in-house monitors are con-

versant with administrative and security matters but not with database content and search strategy. In discussing UDRI's desire to help users with content questions, I was informed by FTD staff that this would be looked into.

Another mechanism for contact with former students could be a newsletter. FTD has been issuing a quarterly document of 30 to 50 pages that consists primarily of administrative memoranda. FTD personnel thought of this document as a newsletter. They appeared to look favorably on a suggestion of a newsletter similar to Lockheed's Chronolog that UDRI is willing to produce.

The UDRI instructors have given thought to developing two types of form letters. The first is targeted for the student's employer at the time the student is designated for the Introductory course. It would provide guidance to the supervisor on the support the student needs to be an effective searcher. The second letter would be a follow-up to the student a short time after he/she completed the course. It would solicit feedback on course effectiveness and on the search activities being performed on the job.

Mr. Brashear has been thinking about the advantages that a static database of limited size might have for training. With such a database, the University of Pittsburgh On-Line Training Center (see pages 39-41) is able to know in advance the retrievals possible with search queries and is thus able to diagnose students' search strategy errors. It is not known whether FTD may be willing to create a training file.

References

"Central Information Reference and Control (CIRC) II, Retrospective Retrieval System Mechanics of On-Line Retrieval," Audio Visual Script, undated. Foreign Technology Division, AFSC, WPAFB, Ohio

Kirk Brashear & Linda Swartzel, "Central Information Reference and Control (CIRC) II Retrospective Retrieval System Mechanics of On-Line Retrieval," Audio Visual Workbook, undated. FTD, AFSC, WPAFB, Ohio

"Central Information Reference and Control (CIRC) II, The Profile System, Online Construction and Maintenance," undated. FTD, AFSC, WPAFB, Ohio

Type of Instruction

Principal mode of delivery: Hands-on online practice

Auxiliary modes of delivery: Lecture,

Printed manuals,

Supplementary printed handouts

Organization Providing Instruction

On-Line Training Center (Pitt)

University of Pittsburgh

LIS Building, Room 808

Pittsburgh, PA. 15260

Instructors

Dr. Elizabeth E. Duncan, Coordinator

Patricia J. Klingensmith

Nina M. Ross

(412) 624-5218

Type of Organization

public, academic

Recipients of Instruction

Any person interested in computerized searching; no restrictions

Class Size

Not to exceed 10

Location of Instruction

Training center at the University

Duration of Instruction

3 days (from 1 P.M. Monday to noon Thursday)

Frequency of Offering/Availability

Approximately one session monthly

Brief Description of Nature of Instruction

This education program emphasizes learning of a particular search system on the thesis that "a thorough knowledge of the system is the basis for efficient and intelligent searching."

At present, only two systems are taught: Lockheed's DIALOG and SDC's ORBIT. Only one system is taught per training course. The course for each

system is available in alternate months. For example, in January 1981, ORBIT was offered and in February, DIALOG.

Although the lecture mode is used to begin each course, online work is begun as soon as possible. Online work constitutes about 50% of students' activities on the second and third days. For this reason, instruction is confined to the On-Line Center that is equipped with 10 student stations, each having a keyboard-and-printer terminal (TI Silent 700), an instructor's terminal equipped with a CRT, and three 21-inch TV monitors. The class size is limited to 10 to ensure that each student has his/her own work station.

The course consists of introduction to, and then drill-and-practice on, log on and search protocols. Then students are given a battery of questions (12 to 15) to search in a particular database. Instructor assistance is available if needed during the period that students develop their search strategies and execute them. Search outcomes and pros and cons of strategy alternatives are discussed in primarily a lecture mode. This is followed by further instruction in, and demonstration of, more complex aspects of the search system followed by another battery of questions for students to apply to a different database followed by discussion of the new search results.

Students are given a workbook for the search system that includes a glossary and detailed explanations and illustrations of elements of the search system. They are also given content descriptions of the various databases that are mainly reproductions of materials issued by the commercial vendors. The most difficult level of learning for the students is the processing of a new set of search questions in databases that were not previously discussed in class sessions. This requires them to use their printed materials and is a test of their ability to work independently as they would be required to do as search librarians.

The amount of online time that is used in this instruction program might be very costly except for a computer technique employed by the program designers. DIALOG and ORBIT emulators have been written for a PDP VAX located in the University's computer center. The emulators were written by a computer science student who updates them as features of the DIALOG and ORBIT systems are added or changed. Tapes containing information on a small number of documents, typically 1500 to 3000, are loaded in the Pitt computer instead of entire databases. Thus teleprocessing (e.g., TYMNET, Telenet) and computer costs of commercial vendors are not incurred. A total cost of \$10/hour was estimated for use of the VAX system. One hour of student use of the commercial system is included to demonstrate effects of complete databases and timesharing with other users on computer system responsiveness and retrieval magnitudes.

Improvements Desired/Planned

A larger classroom is planned with a capacity for 20 to 24 terminal workstations. A larger class size (15) will then be tried. Dr. Duncan does not want to lose the personalized instruction aspect of the present program that would occur with too large a class.

Little change is seen as needed in the instruction materials. The one program of instruction on the access system (DIALOG, ORBIT) is considered sufficient and appropriate for this Center. In-depth education about particular databases and about the most effective applications of the access systems to particular databases is considered the province of each database producer. No advanced course on access systems per se is believed necessary.

References

Elizabeth E. Duncan, Patricia J. Klingensmith & Nina M. Ross, "Manual for On-Line Training Center, Number 1 - DIALOG"

Elizabeth E. Duncan, Patricia J. Klingensmith & Nina M. Ross, "Manual for On-Line Training Center, Number 2 - ORBIT"

Type of Instruction

Principal mode of delivery: Lecture integrated with hands-on practice

Auxiliary mode of delivery: Manuals

Organization Providing Instruction

House Information Systems (H.I.S.)

Committee on House Administration

U.S. House of Representatives

House Annex 2 (2nd & D Streets, S. W.)

Washington, D. C. 20515

Instructors

V. Douglas Hines, Head, Education and Training Systems, directs an instruction staff of four

(202) 225-0217

Recipients of Instruction

Members of Congressmen's staffs (mainly legislative assistants or LAs) and House Committee staffs (about 1000 people per year)

Class Size

6 to 8 maximum

Location(s) of Instruction

Training room in House Annex 2

Training room in Longworth Building (House office bldg.)

Duration(s) of Instruction

LEGIS, SCORPIO: two 2-hour sessions

JURIS: one 2-hour session

Advanced LEGIS: one 2-hour session

SOPAD, FAPRS, MBIS: one 1½ hour session

Frequency of Offering/Availability

Dependent on demand

Up to approximately 12 classes weekly is within planned workload

Background

House Information Systems (H.I.S.) was created in 1971 and provides computer support to the House of Representatives. H.I.S. has grouped its services that furnish access to online databases under the name MIN - Member Information Network. Currently, 6 databases are available:

LEGIS (Legislative Information and Status System)

Contains status information on legislation from the 93rd Congress to the present

SCORPIO (Subject-Content-Oriented Retriever for Processing Information Online)

System contains 7 databases; see description of CRS's SCORPIO training at pages 51-56

JURIS (Justice Retrieval and Inquiry System)

Contains opinions of the Supreme Court, Courts of Appeals, other Federal Courts, the U.S. Code, other federal regulations

SOPAD (Summary of Proceedings and Debates)

Contains information about House floor proceedings, floor schedules, and summaries of vote actions

FAPRS (Federal Assistance Program Retrieval System)

Is the online version of the Catalog of Federal Domestic Assistance, contains federal loan and grant program data

MBIS (Member Budget Information System)

Contains budget tables prepared and updated by the House Budget Committee including data by program groupings, action on appropriation bills, aggregates by spending committees, definitions of terms, and early warning reports

H.I.S. produces the LEGIS, SOPAD and MBIS databases. The Congressional Research Service, Library of Congress, produces SCORPIO. The Department of Justice produces JURIS. The Office of Management and Budget has the responsibility for maintaining FAPRS.

Other activities of H.I.S. include development and maintenance of an electronic voting system (in continuous operation for over two years), assessments of office automation needs and aid with acquisition and installation of computer equipment and services, provision and maintenance of text processing software, provision and maintenance of a conversational graphics system called IMAGE, and operation of a central computer facility for the House.

Brief Description of Nature of Instruction

A distinguishing feature of the H.I.S. instructional approach is the emphasis accorded to hands-on practice by the student in contrast with instructor-performed online demonstrations or lesser amounts of online practice common in other methodologies. Other differences are: (a) the short training times considered sufficient and (b) the simple structure of some databases (SOPAD, FAPRS, MBIS).

For two of the databases having complex content structures, SCORPIO and JURIS, instruction programs have been developed by their federal agency producers. The instruction programs of the Congressional Research Service and the Department of Justice are available to the same user groups as those of H.I.S.

The content of the H.I.S. training manuals suggests that individuals are being provided with bare essentials to enable them to perform a few frequently occurring types of retrieval as the need for information arises. Most of the trainees are not expected to be searchers. Many of the trainees may access the databases only occasionally. Trainees are apparently forced by the pressure of their work to cancel even the short scheduled sessions with some frequency, a further indication of their relationship to searching vs. other activities. Additionally, users may obtain search assistance at any time from the H.I.S. User Assistance Office (UAO) that has a staff of six people who work in shifts to ensure that assistance is available at any hour the House is in session (including early morning hours). UAO staff go to Congressmen's offices to provide assistance when telephone help doesn't suffice. Persons trained in the systems may request retraining as they deem it necessary to refresh their knowledge.

All of the four instructors are competent to teach the use of all of the databases. Each may be assigned up to 8 hours of teaching per week.

Each course is taught by a single instructor. The instructors have found that trainees learn faster when two share a terminal. The Hazeltine 1510, A CRT and keyboard, is the terminal in current use. The learning stations do not have printers by trainee preference. It is thought that they may not wish to have hard-copy records of their learning errors. Although many Congressmen's and committees' office terminals are equipped with printers, it is believed that many of this user group query files only to obtain one or two items of information; they don't need a record of the response. Trainees are instructed in use of the print option and they may request a printout of their terminal use that is done at a printer in another location.

Despite notable uses of information technologies by the House, many of the staff are slow to adopt the automated mode of searching for information. H.I.S. has used the education channel 6 of the House's cable TV system to advertise the availability of training for LEGIS, its most heavily used database. The videotape prepared by H.I.S. is broadcast twice weekly, but the response from the TV promotion suggests that few of the target audience are watching (or are interested).

Improvements Desired/Planned

At present, the User Assistance Office is reactive, responding to requests for help. Thought is being given to monitoring the usage of databases by persons given training and to make follow-up inquiries at least of users in the lowest quartile to gain an understanding of reasons for low usage.

H.I.S. is readying a new version of its printed materials for its users. Heretofore, printed materials have been distributed as separates. In 1981, a looseleaf binder containing all of the manuals and quick-reference cards will be made available.

Individuals in Congressmen's state offices have access to the H.I.S. databases although not much remote use of them has been made. A trend, however,

is being discerned of greater use by Congressmen of home office staffs. In anticipation of requests for training at locations other than the two classrooms, H.I.S. is examining mechanisms for training at a distance. These mechanisms may also be useful to people whose schedules do not permit attendance at the live training sessions.

One methodology is the use of audio tapes as replacements for classroom instructors. Two tapes, one for LEGIS and one for JURIS, have been produced. They are to be evaluated; they have not yet been distributed. The sound portion contains, in essence, the same information that an instructor is likely to include in a lesson plan. The trainee is expected to be at a terminal. The tape instructs the trainee in the use of the terminal and the database manual. The trainee is "walked" through elementary features of the command language and the database and is continuously given exercises and searches to perform at the terminal followed by verbal descriptions of what he/she should have done.

A second methodology is computer-based instruction (CBI). H.I.S. staff explored three CBI software systems -- PLATO of Control Data Corp., SCHOLAR/TEACH of Boeing Computer Services, and IIS (Interactive Instructional System) of IBM. SCHOLAR/TEACH 3, Version 4 is currently being used to write a CBI program that teaches the legislative process. This program, when finished, will not replace any of the online training. It could, however, be a precursor training module for new Congressional staff. Knowledge of the legislative process is assumed in training for LEGIS, SCORPIO, and other databases. Other uses of CBI are being sought that will complement rather than replace current instruction in the use of online databases.

References

"The FAPRS How-To Manual," June 1980.	"The MBIS How-To Manual," May 1980.
"The JURIS How-To Manual," [1980].	"The SOPAD How-To Manual," [1980].
"The LEGIS How-To Manual," [1980].	
"The Advanced LEGIS How-To Manual," [1980].	

Type of Instruction

Principal mode of delivery: Self-instruction online
(a form of computer-aided instruction)

Auxiliary modes of delivery: Lecture,
Supplementary printed materials

Organization Providing Instruction

Principally library schools, but need not be limited to academic institutions
In the near future, for CAS materials, probably chemistry departments

Developers of Instruction Materials

Lockheed Information Retrieval Service (LIRS)
3460 Hillview Avenue
Palo Alto, CA. 94304

Chemical Abstracts Service (CAS)
P. O. Box 3012
Columbus, Ohio 43210

Contact Persons

For LIRS: Sophie K. Hudnut, DIALOG Training Coordinator
(415) 858-3810; (800) 227-1927 (except CA); (800) 982-5838 (in CA)

For CAS: Diane Yoder, Manager, User Education
(614) 421-6940 x2945

Type of Organization

LIRS: commercial online services vendor
CAS: not-for-profit, database producer

Recipients of Instruction

LIRS: individuals with a rudimentary knowledge of DIALOG, although more
skilled persons may find this a useful refresher
CAS: individuals needing in-depth knowledge of how to use CA databases

Class Size

primarily the individual learner

Location of Instruction

any terminal with access to the Lockheed computer system

Duration of Instruction

varies, determined by the individual's learning needs and preferences

Frequency of Offering/Availability

at the learner's option

Brief Description of Nature of Instruction

This mode of instruction has been named ONTAP by Lockheed, its principal developer; this is an acronym for ONline Training And Practice.

Currently, there are three ONTAP files in the Lockheed system:

File 201, ONTAP ERIC

File 204, ONTAP CA SEARCH

File 231, ONTAP CHEMNAME

Lockheed has plans to provide ONTAP files for each of the databases in its system, but implementation of these plans does not seem to have a top priority.

ONTAP files are small samples of the respective databases. By working with a file of known content and manageable size, instructors can formulate exercises and search questions that they can apply to the file, examine the response, and modify to fit aspects of search strategy and/or file content they want to demonstrate to students. Then they can assign these exercises and questions to students and be able to judge from students' responses the level of student learning and expertise. Alternatively, questions and answers can be provided in a workbook usable in a self-instructional mode. With large and/or open-ended files, instructors either couldn't have complete foreknowledge of the response or lists of citations would be too lengthy for practical inclusion in a workbook.

Lockheed produces the tutorial printed material for ONTAP ERIC and the Chemical Abstracts Service issued a 250-page manual for Files 204 and 231 in September 1980.

ONTAP ERIC is composed of the 1975 records of the ERIC database. It contains 32,120 citations that appeared in the 1975 issues of Resources in Education and Current Index to Journals in Education. Lockheed obtained the cooperation of 15 professional librarians in user organizations to evaluate

29 test questions and search responses. The questions are divided into three levels of complexity: simple, medium, and difficult.

Students are given a description of ONTAP ERIC that includes the list of the test questions and instructions for using the database in an online self-instructional mode. The description also contains references to other printed materials about the database. The self-instructional program is stored in Lockheed's computer. The student selects a question, enters a search strategy, and obtains a result. He/she can then compare his/her result with the response developed by the professional panel. The comparison can be by numeric count (Number of citations in common) and by citation record for references not retrieved by the student searcher. By diagnostically examining the latter records, the student is supposed to be able to identify deficiencies in his/her search strategy. All DIALOG system features can be used in ONTAP ERIC except SEARCH-SAVE and PRINT (the offline print command; the online print command is TYPE).

The CAS files consist of 15,700 records that were published in Issues 15 and 16 of Chemical Abstracts Volume 87 (two weeks of October 1977). In a test of the CAS manual, two chemistry students at Otterbein College and Rochester University, respectively, were taught the logon procedure and then worked independently with the manual and CAS search aids for two weeks. The manual covers fundamental concepts of online searching, comparisons of manual and computerized searching, Boolean operators, the command language, the structure and content of the CA databases, indexing policies and practices, and search strategy development. The largest portion of the manual gives suggested search strategies for about 12 practice problems. The CAS tutorial does not include the relevance/recall feature in ONTAP ERIC.

This is not computer-assisted instruction in the conventional use of the term, but the ONTAP concept is certainly classifiable as a form of

computer-aided instruction in that computer processing is an integral part of the teaching/learning process.

LIRS charges \$15 per connect-hour for use of the ONTAP files. CAS does not levy a royalty fee on its ONTAP files. LIRS gives 2 hours of free practice on ONTAP files to those who enroll in its introductory course, the System Seminar (see page 13).

References

"ONTAP ERIC," File 201, Preliminary Edition, June 1979. Lockheed DIALOG Information Retrieval Service, Palo Alto, CA.

"CA Search for Beginners: An Introduction to On-line Access to CA SEARCH," Lockheed Version. Chemical Abstracts Service, Columbus, Ohio, 1980.

Harry J. Hamilton, Erica Scurr & Diane K. Yoder, "An Introductory Manual for Training Science Students in On-Line Access to CA Search," unpublished paper presented at ASIS Annual Meeting, Anaheim, CA, October 1980.

Type of Instruction

Principal mode of delivery: Self-instruction online
Computer-based instruction (CBI)
Auxiliary modes of delivery: Video tape,
Printed materials,
Demonstration searches

Organization Providing Instruction

Information Systems Section (CRS)
Office of Automated Information Services
Congressional Research Service
Library of Congress
Madison Building, Room LM 222
Washington, D. C. 20540

Instructor

Jeffrey Griffith
(202) 287-6447

Type of Organization

public, federal government, database producer

Recipients of Instruction

Congressional staff members, Congressional Research Service analysts

Class Size

Pre-instruction session: 3 to 12 people
Instruction: 1 person per terminal

Location of Instruction

Terminal room in ISS office

Duration of Instruction

Learner dependent

Frequency of Offering/Availability

Learner dependent within system scheduling possibilities

Background

This instruction program trains in the use of the SCORPIO system (Subject-Content-Oriented Retriever for Processing Information Online). The system currently contains the following databases:

Congressional Record (CR) Files

The CRs for the 94th (2nd Session), 95th, and 96th Congresses (1976, 1977-1978, 1979-1980 respectively) that contain abstracts of CR pages with floor debates indexed by bill numbers, dates, names of members of Congress, and subject terms. These are searchable elements. The databases are produced by Capitol Services, Inc.

Bill Digest Files

Data from the publication "Digest of General Public Bills and Resolutions" for the 94th, 95th, and 96th Congresses. These files permit a bill's passage through Congress to be monitored. In addition to an abstract, bill digest, and revised digest, the files contain information on bill sponsor and cosponsors, official title, short title, committees of origin, referral, and reporting, floor actions, companion bills, and public law numbers.

Major Issues File

Titles, subject descriptors, and numbers for over 300 papers called "Issue Briefs" written and kept updated by CRS staff members on major public policy issues. Each Brief contains a definition of the issue, background and policy analysis information, references to Congressional actions, and a bibliography.

Citation File

Abstracts and bibliographic data for periodical articles, pamphlets, GPO publications, UN documents, lobby-group documents, and other publications selected by CRS staff for their relevance to major public policy issues. Searchable elements include LIV (Legislative Indexing Vocabulary) subject terms.

LC Computerized Catalog

Bibliographic data extracted from the MARC database for books in the English language received in LC since 1969, books in French received since 1973, and books in all Roman alphabets received since 1977.

National Referral Center Resources

Name, address, telephone number, topics of concern, collection and database holdings, publications, and dissemination services for organizations willing and qualified to provide information on physical science, technology, and social science topics. The file is maintained by the National Referral Center.

General Accounting Office Recurring Reports

Abstracts and data on agency names, Congressional recipient, mandatory legislation, oversight committees, frequency, date, and subject content for all recurring reports required of federal agencies by law. GAO produces the database.

GAO Information Systems and Sources

Abstracts and data on agency name, contact point, Congressional responsibility, funding category, and subject content for informational documents (e.g., annual reports) and information systems (e.g., bibliographic systems, management information systems) produced or maintained by federal agencies. GAO produces the database.

GAO Program Evaluations

Abstracts and data on the sponsoring agency, managing agency, program name, Congressional recipient, public availability, and subject content for about 1700 federal programs that produce evaluations of their activities. GAO produces the database.

Brief Description of Nature of Instruction

Except for a brief non-CBI beginning, this instruction program relies entirely on computer-based instruction (with human assistance if requested) to train students in the use of the first four databases listed above, namely the Congressional Record, Bill Digest, Major Issues, and Citation files. The program uses the PLATO system marketed by the Control Data Corp.

Trainees are usually given a 45-minute briefing in groups of 3 to 12. The briefing includes a 14-minute TV film in which Jeffrey Griffith presents introductory information about the four databases, shows some of the source material about which information is extracted and stored, and mentions the

need to learn search strategies to profitably use the databases. Printed material about SCORPIO is distributed including a Survey of Interests form. This form enables the trainee to know in advance the learning options available to him/her and to reach a decision on topics for which instruction is desired.

The CBI program is menu driven, and the Survey of Interests material reappears on the CRT, forcing a selection if the trainee is to proceed. A short routine, "Introduction to SCORPIO Commands" that ends with 7 test questions that must be answered, precedes learning modules about the databases. This ensures a basic knowledge of the command language that is needed for database manipulation.

The CBI program was written by Control Data Corp. staff under contract to CRS. A first draft was written between January and March 1980 and was tested in June and July. Mr. Griffith produced a program revision in August to reduce the run time. (The first draft also rambled, had too little student involvement, and was boring in my judgment based on a small portion of it that I worked with.) CDC staff produced the present version in September and October 1980.

I examined the program primarily via the modules of the Citation file. I used approximately 1½ hours for 7 modules. Satisfying features of the program include:

- a. The appearance of check marks beside the options in a menu that are selected so that selections don't have to be remembered.
- b. Reinforcements through restatements appearing on the screen after test questions are answered correctly to insure that, should the answers have been guessed at, correct learning can be enhanced.
- c. Highlighting of data elements of a record by enclosing each, in turn, in a box that initially flashes during an explanation of the data element. This has the effect of helping the trainee

locate the placement of the data element in relation to other data elements as well as seeing how it appears in a record (i.e., whether abbreviated, with words or numbers, etc.).

d. Brevity of instructional messages with many requirements for student response. This contrasts with the first version that showed long paragraphs of text, a characteristic I also observed in several PLATO programs for other subject matter. Most of the instruction is now packaged in 1 to 3 sentence sequences that seem about right for attention and learning.

e. Frequent insertion of questions either requiring the trainee to use the keyboard or touch an area of the screen. The change from one to the other provides a useful diversity.

A frustrating feature was a limitation in the assistance available in HELP routines. I tried HELP for an explanation of RETRIEVE. The present program gives general messages and requires the trainee to progress through a fixed set of messages that supposedly will include desired information. In one use of HELP, I never found an explanation for an error I made and even though I could proceed through the instruction program, this created a sense of dissatisfaction.

CRS usually schedules 1 or 2 hours per terminal session for a trainee rather than longer periods because of the fatigue factor. I experienced a fatigue point after 55 minutes and left the terminal after 2½ hours because of mental and physical fatigue.

Several practice problems are given to the trainee after he/she completes the modules selected for study. These may be worked online. They give the student a more thorough yardstick for measuring the amount of learning that has occurred than mere response to the program's questions does.

The non-CBI beginning is a 14-minute color TV program that features a cast of one, Mr. Griffith. The film holds the interest of the viewer because

it is not merely a replica of a lecture. Through verbal description and visual images, the film introduces the viewer to the SCORPIO system and the content scope of the online databases. It gives the viewer a cursory foundation for choosing appropriate CBI programs for detailed study. Mr. Griffith and another staff person spent a combined total of about one week on the script. The staff person worked about half time for an additional 7 to 8 week period on the storyboard, assembling materials, and directing and editing the film. The film was shot in two days in a GAO studio.

Improvements Desired/Planned

Several changes and additions were made to the command language in 1978 and 1979. An adjacency capability will probably be added in 1981. Several additions may be introduced into the CBI program to reflect the 97th Congress (1981-1982). No other major system changes are anticipated in the near future. Minor modifications are expected to be provided to trainees by means of printed materials.

References

"Introduction to SCORPIO," July 1980.

"Reference Guide, SCORPIO, Subject-Content-Oriented Retriever for Processing Information On-line," Library of Congress, 1977. (Update pages issued in 1978 and 1979)

FINDINGS, PART II - INSTRUCTION PROGRAM COMPARISONS

Table I presents a comparison of the instruction programs in four major areas: (see pages 68-75)

1. Purposive Documentation
goals, objectives, criteria
2. Education Program
components, duration(s), availability, location(s), participants
3. Resources
human, equipment, facilities, instructional materials
4. Evaluation/Feedback Mechanisms
instruments, tests, follow-ups, user groups

Since little has been published on the evaluative analysis of education programs for information professionals, some comment about the elements of Table I may be helpful. In a paper written by the investigator several years ago, characteristics of evaluation methodologies were discussed.² In the terminology of that paper, the elements of Table I are criterion variables. An education program designer could select appropriate variables and impose qualitative or quantitative desiderata on them, for example, a student/instructor ratio in the range of 10/1 to 15/1. These specifications could then serve as program design guidelines as well as variables by which programs could be periodically evaluated. The elements of Table I were developed for online instruction programs. Different elements may be needed for other types of courses.

1. PURPOSIVE DOCUMENTATION

Most programs are weak in purposive documentation. Typically, only very general overall goals are stated. Only GLSIM and NLM have produced at least partially measurable objectives. GSLIM course syllabi are required to include specific objectives and exit skills students are expected to acquire.

This documentation is a typical requirement in academic institutions. NLM's

documentation is more extensive; objectives have been developed for each lecture. Most of the objectives can be performance tested. NLM's "System Mechanics" lecture, for example, has 5 objectives, one of which is "Describe the purpose, entry format, and results of the use of the following ELHILL commands: TIME, CAPS, ...etc." (28 commands are listed). The education community has been promoting the use of measurable objectives as an aid to program design and evaluation. It can be contended that courses without prespecified directions may be less effective in conveying need-to-know information. It is certainly true that the absence of objectives precludes a measure of accomplishment (unless this is created after the fact).

2. EDUCATION PROGRAM

Four of the programs have a multi-course structure; the remainder are either single course programs (GSLIM, Pitt) or they have a single course per database (H.I.S., ONTAP, CRS). Each of the four has, minimally, an introductory course and one advanced course. LIRS is the biggest course producer with 12 subject seminars in such fields as Biosciences, Business, Government Documents, and Nonbibliographic Databases, an advanced search strategy seminar, a system refresher seminar, and periodic system updates in addition to its introductory System Seminar. It is likely that LIRS will introduce 2 or 3 more subject seminars in 1981. NLM has experimented more with course content, duration, and format than any of the other organizations.³

In duration, all short courses differ markedly from for-credit academic courses. None exceeds a one-week period. NLM, that had an 8-month training program when MEDLARS (Medical Literature Analysis and Retrieval System) was first automated in the mid-1960's redesigned to a 3-week program for MEDLINE's debut in 1971 and changed to its present multi-course format in 1977. NLM is now exploring modifications of its 5-day advanced course to shorter, specialized segments so that people will be able to attend only those portions of interest

to them. To some extent, a 5-day course of 35 to 40 hours provides 60-70% of the instructional contact time of an academic course. Whether concentration on a topic for a shorter period or internalization of the topic over a longer period produces greater learning and retention is a debatable issue. Several short-course instructors (DTIC, UDRI) expressed concern about inadequacy of the exposure for adequate learning. On the other hand, periods of several hours appear sufficient for H.I.S. trainees and possibly for CRS trainees. Complexity of the databases and the command language, and perhaps most importantly the learning purpose of the trainee, can materially affect the amount of exposure perceived to be sufficient.

At present, only LIRS's ONTAP programs are substantially location independent (dependent only on the availability of a terminal). Of the instructor-based courses, LIRS's evidence the greatest mobility. In addition to offering courses on a regular schedule at field offices and other facilities throughout the U.S., LIRS provides training at client-designated sites for a fee. (Many public-access database producers also offer short courses periodically in major cities in the U.S. but less extensively than LIRS). Although NLM had provided abbreviated introductory and advanced courses at Regional Medical Libraries (RML) at least quarterly, travel and personnel constraints may limit this in the future. NLM exerts a high degree of quality control over its courses. Through 1980, it had authorized only one institution, the RML at the University of California, Los Angeles, to provide training recognized as equivalent to that given by NLM staff. (NLM and UCLA trainees receive Continuing Education credits from the Medical Library Association.) One or more other institutions may receive NLM authorization in 1981. Some instructors don't favor travel because of the added burden of fatigue on an already stressful and fatiguing task. Other instructors regret their inability to bring training out of the artificiality of a classroom to the terminals and

actual work environments of individuals where they think learning and retention might be greater.

Undoubtedly some people who have wanted to attend courses that are given at only one or a few locations have been unable to do so because of travel expenses. Even when there is no course fee, as in six of the instances in this study, travel costs can range, conservatively, from \$100 to \$500 for transportation, \$20 to \$45 per day for hotel/motel accommodations, and \$20 to \$30 per day for food. The LIRS arrangement that brings one instructor to any location for \$300 for a half day, \$375 for 2 half-days, and \$500 for 1½ days is more cost effective if (sometimes a big "if") the training site is adequately equipped. The ONTAP mode of learning may be the most cost effective for many students when it has been extended to a larger number of databases. In a test of ONTAP CHEMNAME, university chemistry students needed 20 hours to complete a Chemical Abstracts Service (CAS)-produced course. Expenses included \$20 for the CAS-prepared manual, \$60 for 4 hours of connect time (at \$15/connect-hour), and the costs of CAS's printed and microform search aids; the latter aids are reference materials that can be shared by many students.⁴ LIRS gives 2 hours of free access to ONTAP files to those who attend the \$65 introductory course.

2a. PROGRAM PREPARATION COSTS

Program preparation refers to all of the activities that are involved in determining the scope of an education program, the specific content of each segment, the sequence of the various segments, and the instructional materials and aids to be employed in each of the segments. To teach the use of online databases, a considerable amount of time is usually spent in developing illustrative search strategies and portions of search strategies to demonstrate particular features of a command language, one or more databases, or both of these elements. The selection of appropriate strategies for the first time (for a new manual) can be particularly time consuming because file responses

may differ from expectations, necessitating new search strategy development.

Instructors usually encounter some system down time during manual preparation that prolongs the material preparation time.

The initial and update preparation times and costs presented in Table I are believed to be very conservative. The code "est." is used for data that were not directly provided but were inferred from other information that was supplied or from the investigator's estimate of times or salary levels. It is believed that the nature of program preparation tasks is such that, unless they are timed as they are performed, recall about times is far from accurate. An effort has been made to limit the tabulated times and costs to professional and technical work, specifically excluding typing and printing times and costs. The CRS contract costs were not subdivided and undoubtedly include overheads and clerical costs as well as professional costs. One might conservatively double costs of the other programs before comparing them with CRS costs (doubling CRSin-house costs as well). For Pitt and ONTAP, times and costs are given only for the production of the syllabus and printed instructional materials; the costs of the programming to produce Pitt's DIALOG and ORBIT simulators and LIRS's ONTAP software are not known. At Pitt, one gifted undergraduate computer science student was credited with writing and maintaining the simulators.

The data suggest that program planning and development plus the production of reasonably comprehensive written manuals take about 1 to 1½ months for each content focus, for example, instruction primarily about a command language (that introduces database content mainly to illustrate features of the language) or instruction about one database (that introduces elements of a command language to illustrate retrieval options from the database). When work is coordinated among several people, an additional ½ to 1 month may be needed. When the instruction encompasses a command language and one or more databases,

the preparation time seems additive. For example, DTIC used 8 man-months for a command language and 3 databases and Pitt used 6 man-months for DIALOG, ORBIT, and a general coverage of LIRS's and SDC's databases. When the databases are complex, the preparation time can be longer, e.g., 3 months for UDRI's Profiles course. When the command language and the databases are simple, some time compression can be achieved, e.g., 1½ to 2 months for language plus database in H.I.S.'s system.

Not unexpectedly, CAI/CBI requires more initial development time. ONTAP is only minimally a CAI program. By providing the student with

- Number of citations in the answer set,
- Number of citations found, and
- Recall and precision percentages for search strategies

the student creates for "canned" questions, the program helps the student learn how to achieve high recalls and precisions. Underlying the program is work by LIRS staff and 15 professional librarians to develop and refine 29 test questions and to arrive at a consensus about relevant citations retrievable from a test file of 32,120 ERIC records.

CRS has used the services of a commercial firm, Control Data Corp. (CDC), to obtain a true CBI program. CDC markets PLATO (Programmed Logic and Automatic Teaching Operation), a system developed in the mid-1960's at the University of Illinois. Several other CBI systems are also on the market; for example, H.I.S. is currently experimenting with Boeing Computer Services' SCHOLAR/TEACH 3. The CRS program now in use is a rewrite. The first version was wordy, long, and required little student interaction. With redirection supplied by CRS staff, the revision is subdivided into modules, each of which can be completed in 8 to 15 minutes, and requires considerable intellectual participation (rather than just button pushing). The \$100,000 cost, however, is ten times that of most of the other instruction programs and twice that estimated for the ONTAP ERIC program (ONTAP CHEMNAME

may be more costly than ONTAP ERIC).

3. RESOURCES

Student/instructor ratio is one of the few criterion variables that is inherently quantitative. Does it have predictive value for course effectiveness? The best answer is that this is not now known. In the DTIC, NLM, and Pitt situations, and partially for UDRI, the upper number of students is determined by available terminals for hands-on practice. Pitt enlarged its terminal capacity in early 1981 and is planning on experimenting with a larger class size.

Only the Pitt, ONTAP, and CRS programs provide each student with a terminal. H.I.S. could readily redesign its format to a one person-one terminal mode but finds that trainees are more comfortable working in pairs. DTIC, NLM, and UDRI are less flexible in format redesign, but instructors indicate participant satisfaction with the 2 or 3 per terminal arrangement. Observation at Pitt and personal experience at GSLIM suggest that many people prefer the one-to-one arrangement if given the option after they have gained experience with the system and databases. Equipment and online costs that this arrangement could generate may prevent its use except when terminals are online to internal computer systems.

The TI Silent 700 continues to be a popular terminal. Notably, NLM and Pitt terminals are not equipped with CRTs although the instructor's terminal at Pitt has a CRT and the training room has 3 TV monitors for online demonstrations. H.I.S. and CRS terminals have no printers. Most H.I.S. clients have single item questions for which they need to know answers, but they have no need for a written record. Printers for them were said to be distracting. They are informed of a print capability to which their terminals are linked should a printout be desired. Users of CRS's PLATO program receive an instruction booklet that lists the retrieval capabilities of the databases;

this may be adequate or more printed materials may be found necessary with usage of the program. I found myself recording the content of screens in a notebook and recognizing the importance, after the terminal experience, of information I didn't record. H.I.S. and a segment of CRS's trainees differ from those of other programs. Except for some users of the CHEMNAME ONTAP program, most students of the other programs are, or expect to be, working as intermediaries for end-users. By contrast, most H.I.S. and CRS students are end-users. These end-users want to learn only enough to be able to retrieve needed information.

Only GSLIM, Pitt, and NLM give evidence of having invested time and money in classroom design, even tho these facilities share with the others a starkness and overcrowding. LIRS and DTIC give courses in the field and are subject to available facilities that can have fewer terminals and closer quarters than their home classrooms. It appears to be a tribute to the topic being taught that so many people, instructors as well as students, have been willing to tolerate poor facilities with little complaint.

Specially prepared manuals or less ambitious guides or booklets are produced in all of the programs. The sentiment was repeatedly expressed that printed materials that students could refer to on the job are an essential regardless of other media that may be employed. DTIC, NLM, UDRI, and Pitt have produced the most extensive manuals/workbooks. NLM's two Workbooks for its introductory and advanced courses are by far the most comprehensive. NLM's objective was to reduce students' need to take in-class notes to a minimum so that they could concentrate on the lecture content. DTIC and NLM also distribute other publications (e.g., thesauri, search aids) that are needed to learn their respective databases. LIRS, GSLIM, and Pitt include references to database thesauri, vocabularies, and search aids in their instruction; usage of these materials is part of GSLIM's and Pitt's instruc-

tion, but students must independently purchase these auxiliary materials. By contrast, the materials N.I.S. and CRS now provide are much shorter than the manuals that were initially distributed; they contain only database content and searching essentials. The content modification is based on client acceptance-testing.

Most of the manuals/workbooks are instructor transferrable in the sense that instructors other than those who prepared the manuals could readily use them and provide instruction that was consistent in coverage and content. The brevity of LIRS materials requires a lesson plan auxiliary to the materials. To use UDRI materials, the instructor must have independent knowledge of the FTD databases that have structural differences from bibliographic files and are complex. Individuals not privy to rationales behind CRS's PLATO programs may not be able to provide satisfactory assistance all the time to students who press the human HELP button.

NLM and Pitt minimize material preparation costs and maximize currency of their materials through the use of an information technology. NLM's workbooks are produced with Vydec word processors. Pitt uses the VAX computer. NLM instructors review the text approximately every two months for currency. The Pitt review is approximately monthly. Both organizations print only the number of copies they expect to need for courses during the period. Thus, they have few outdated copies that need to be discarded or updated. Additionally, both use the looseleaf format so that last-minute insertions can easily be made and to enable students to amend their texts or insert auxiliary materials.

4. EVALUATION/FEEDBACK MECHANISMS

Minimally, two parties in an education situation want a measure of course effectiveness. The student wants to know whether he/she has learned what should have been learned; this relates to course objectives and is one

important reason for performance-measurable objectives. The instructor wants to know whether the content, the method of presentation, time allocations to various topics, etc., achieved the intended information transfer. Frequently, host institutions and sponsors want students' perceptions of the adequacy of the instructor(s), course content, and/or the study facility/equipment/computer system, etc. All parties are interested in effectiveness -- how well the program achieved its goals.

The most prevalent instrument that has been used for evaluation in education is the written test administered to the student. Except for the university course, no such test that is submitted to the instructor for grading is used in online instruction. All but the LIRS courses give students various degrees of opportunity to assess their own progress through the assignment of problem queries for which students individually or in groups develop search strategies that they test in online practice. Most instructors view this mode of instruction as essential to retentive learning. It has no substitute for building student confidence and competence. NLM's MEDLEARN most resembles an academic test but it is self-administered. It is a CBI program that students accepted for NLM's introductory course are expected to complete before arriving at NLM or UCLA. MEDLEARN is primarily expected to give students experience in logon/logoff procedures and some familiarity with online databases. Students receive special passwords and free time for MEDLEARN and can obtain telephone assistance if needed.

Six of the programs distribute questionnaires to students at the end of the course that request evaluative information. The instruments for DTIC, LIRS, NLM, UDRI, and Pitt are presented in Appendix B. For additional comparison, forms are also included that are used by the American Society for Information Science (ASIS) for short courses and preconference tutorials and by the U.S. Government for training course programs (Optional Form 170). DTIC's questionnaire and those of ASIS and the Government are the most formal.

Several of UDRI's questions are the most specific. Questions 3 and 4 of the "Basic Class Evaluation" and the first page of "Online Profile Evaluation" questions, for example, probe details of the command language and search features. DTIC's questionnaire is at about the degree of specificity of the remaining questionnaires. The 5-level rating scale used in the ASIS questionnaire is often considered preferable because people usually perceive a finer gradation than the three options DTIC's questionnaire permits. The ASIS questionnaire seeks evaluative information at a slightly more detailed level than DTIC's, and in some instances the wording is more "user friendly."

To the teacher, an unsatisfying aspect of teaching often is the absence of a longer term feedback mechanism. LIRS, DTIC, NLM, and occasionally H.I.S. instructors get such information, though not directly and irregularly, from persons at the customer service desks of these organizations. The NLM arrangement probably provides the most feedback because members of the MEDLARS Management Section perform all Section activities including manning the service desk and teaching. This distribution of tasks may change in 1981, teaching being assigned to 2 or 3 persons, but the physical proximity of Section members is likely to retain the feedback flow.

User group meetings provide another mechanism for feedback. User groups have developed among DTIC and NLM clienteles. Each of the groups has regional quarterly meetings and an annual meeting at the central location (DTIC and NLM, respectively). The Update programs sponsored by LIRS several times annually, usually before or after the annual meeting of a major professional society concerned with online databases, are similar to user group meetings. The meetings are effective two-way communication mechanisms. The database producer or vendor disseminates new system information and "helpful hints" type material and database users share experiences and discuss operating problems. Suggestions presented at these meetings have effected search system changes as well as changes in instruction programs.

TABLE I. CHARACTERISTICS OF ONLINE INSTRUCTION PROGRAMS

Name of Organization	LIRS	GSLIM	DTIC	NLM	UDRI	Pitt
Type of Organization	Online vendor	Academic institution	DB producer	DB producer	Contractor	Academic institution
I. PURPOSIVE DOCUMENTATION						
1. Broad Goal Expressed	Intro: Yes Others: No	Yes	Yes	Yes	Yes	Yes
2. Specific Objectives	No	Yes	No	Yes	A few	A few
a. Expressed						
b. In performance measurable terms	N/A	Partially	N/A	Yes	No	No
3. Criteria						
a. Qualitative	No	Yes	No	Yes	No	No
b. Quantitative	No	No	No	Approximately	No	No
II. EDUCATION PROGRAM						
4. Modes of Delivery						
a. Principal	Lecture	Lecture	Lecture	Lecture	Lecture	Lecture
b. Auxiliary	Printed materials, Online demonstra- tions, Limited online practice	Printed materials, Online demonstra- tions, Hands-on practice	Hands-on practice, Printed materials, Flip charts	Computer-based instruction, Printed materials, Hands-on practice	Slides, workbooks, Online practice, Supplementary printed materials	Lecture, Printed materials
5. Components						
Introductory (System Seminar) Subject Seminars Refresher Updates	Single course	Dedicated system: Introductory Intermediate Advanced Datalup system: Introductory	Introductory Abbreviated intro. Advanced	Introductory Advanced SDI profiles	Introductory Advanced SDI profiles	Single program
6. Duration(s)	Intro: 1½ days Subj: ½ day Refresher: ½ day Update: 2 days	9-11 weeks (54-64 scheduled hrs. plus individu- dual practice time)	Dedicated: Intro: 5-10 days Inter: 3, 5 days Adv: 3 days	Intro: 5 days Abbrev. intro: 3 days	Intro: 3 days Advanced: 1½ days Profiles: 1½ days	3 days (2 full, 2 half)
			Advanced: 5 days			
			Datalup: Intro: 2, 3, 5 days			

TABLE I. CHARACTERISTICS OF ONLINE INSTRUCTION PROGRAMS (cont.)

Name of Organization	H.I.S.	LIRS/ CAS (ONTAP)	CRS
Type of Organization	DB producer	Vendor/ DB producer	DB producer
I. PURPOSEIVE DOCUMENTATION			
1. Broad Goal Expressed	Partially	Yes	No
2. Specific Objectives			
a. Expressed	No	Debatable	No
b. In performance measurable terms	N/A	No	N/A
3. Criteria			
a. Qualitative	No	No	No
b. Quantitative	No	No	No
II. EDUCATION PROGRAM			
4. Modes of Delivery	Lecture integrated with hands-on practice	Self-instruction online (CBI)	Self-instruction online (CBI)
a. Principal			
b. Auxiliary	Brief manuals	Printed materials, Videotape, Pre-instruction session	Printed materials, Lecture
5. Components	Single program for each database except LEGIS	Single program for each database	Single program with selection options
6. Duration(s)	2 hrs. or 4 hrs.	Student's choice	Student's choice

TABLE I. CHARACTERISTICS OF ONLINE INSTRUCTION PROGRAMS (cont.)

	LIRS	CSLM	DTIC	NLM	UDRII	Pitt
7. Availability Frequency	Intro: weekly Subj: Seminars, Refresher: 8 per quarter Update: 2-3/yr.	Quarterly Others: by demand	Intro: at least monthly Others: by demand	Intro at least monthly Advanced: 6-7/yr Abbrev. intro: quarterly	Intro: monthly Adv: semi-monthly Profiles: semi-monthly	monthly
8. Location(s)	Lockheed field offices, host facilities	Univ. Denver campus	DTIC and host sites in field	NLM; one authorized field site	Univ. Dayton campus	Univ. Pittsburgh campus
9. Class Size(s)	Intro: up to 12 Subj: up to 25 Refresh: up to 25 Update: open	12 to 40	8 to 10	Intro: 18 to 20 Abbrev. intro: up to 50 Adv: 18 to 20	6 to 12	10
10. Participant Categories	Mainly DIALOG users (includes practicing librarians)	Graduate students (includes practicing librarians)	Federal agencies' staff; DOD contractor personnel	Users of MEDLINE only	FTD-approved federal agency and contractor personnel	Users of DIALOG, ORBIT
11. Cost to Participants	Intro: \$65 Sub: \$25 each Refresh: \$25 Update: \$110 plus travel, per diem	\$315 for 3 quarter-hours	Direct: none Indirect: travel, per diem	Direct: none Indirect: travel, per diem	Direct: none Indirect: travel, per diem	Direct: \$150 Indirect: travel, per diem
III. RESOURCES						
12. Teaching Staff						
a. Student/Instructor Ratio	12 to 25/1	12 to 40/1	8 to 10/1	18 to 20/1	6 to 12/2	10/2 or 3
b. Minimum Number Instructors/Course	1	1	1	2	2	2
13. Equipment						
a. Specialized, an integral part of instruction	Sometimes	Yes	Yes	Yes	Yes	Yes
b. Type/Model	Varies	TI Silent 700 Digilog Hazzeline CRT Sony TV TV monitors	Univac 100 Univac 200 (CRT, keyboard, printer)	TI Silent 700 (CRT, keyboard, printer)	Teletype 40/8 (CRT, keyboard, printer)	TI Silent 700 (keyboard, printer)
c. Cost	N/A	Purchase	Purchase	Purchase	On loan from FTD	Purchase
(1) Purchase/Rental						
(2) Maintenance						

TABLE I. CHARACTERISTICS OF ONLINE INSTRUCTION PROGRAMS (cont.)

	H.I.S.	LIRS/CAS	CRS
7. Availability Frequency	On demand	Student's choice	Student's choice within system availability
8. Location(s)	two House buildings	Within limits, student's choice	CRS office (but expandable)
9. Class Size(s)	6 to 8	1	1
10. Participant Categories	Congressmen's and Committees' staff members	Primarily users of databases covered	Congressional staff members, CRS analysts
11. Cost to Participants	Direct: none No travel involved	2 hrs. free to Intro course students; \$15/connect-hr.	None for trainees; \$25,000 contract for terminals and system
III. RESOURCES			
12. Teaching Staff		N/A	Pre-instruction: 3 to 12/1 Instruction: N/A
a. Student/ Instructor Ratio	6 to 8/1		
b. Minimum Number Instructors/Course	1	N/A	N/A
13. Equipment			
a. Specialized, an integral part of instruction	Yes	Yes	Yes
b. Type/Model	Razeltine 1510 (CRT, keyboard)	Varies	CDC PLATO terminal (CRT, keyboard)
c. Cost	Purchase (1) Purchase/Rental (2) Maintenance	Varies	Included in usage fee

TABLE I. CHARACTERISTICS OF ONLINE INSTRUCTION PROGRAMS (cont.)

	LIRS	GSLIM	DTIC	NLM	UDRI	Pitt
d. Special Training Needed to Operate	Yes, not given here	Yes	Yes	Yes	Yes	Yes
14. Facilities Employed	Varies	Classroom plus terminals lab	Classroom (contains terminals)	Classroom (contains terminals)	Classroom, terminals lab.	Classroom (contains terminals)
15. Instruction Materials						
a. Specialized, integral part of course	Yes	Yes	Yes	Yes	Yes	Yes
b. Types of Materials	Workbooks Newsletter	Manuals, Search aids, Thesauri, Periodical papers	Manuals, Search aids, Thesauri	Workbooks, Search aids, Vocabulary guide, Technical bulletin	Workbooks, Search aids, Vocabulary manual-type handouts	Manual, Search aids
c. Production Source(s)	all in-house	in-house, online service vendors	all in-house	all in-house	All in-house	In-house and externally produced
d. Ease of Content Preparation	Moderately complex	Moderately complex	Moderately complex	Moderately complex	Moderately complex	Moderately complex
e. Ease of Use by Instructor	Not readily transferable	Transferable	Transferable	Transferable	Not readily transferable	Transferable
f. Ease of Use by Student	Not self-instructional	Partially self-instructional with help	Self-instructional	Partially self-instructional	Partially self-instructional	Partially self-instructional
g. Update Frequency	At least annually, 2-3 times per year when necessary	3-6 mos.	No fixed schedule	No fixed schedule	No fixed schedule	No fixed schedule
h. Initial Preparation Time	10 man-days, 1 person, + review	2 mos., 3/4 time, 1 person	4 mos., 2 people	2 mos., several people	Profiles: 3 mos., 1 person Advanced AV: 1½-2 mos., 2 people	6 mos., 1/3 time, 3 people
i. Initial Preparation Cost	\$1000 + ?? est.	\$5000	\$6500	\$6000 est.	Profiles: \$5500 est. Adv: \$7200 est.	\$12,000
j. Update Preparation Time	2-3 man-days	3 weeks, ½-3/4 time	6 mos., 1/4 time, 2 people	1-1½ mos., several people	N/A yet	3 days, 1/3 time, 3 people
k. Update Preparation Cost	\$200-\$300 est.	\$700	\$2500	\$2500-\$3700 est.		\$300 est.
l. Pilot/Field Test, Evaluation	Yes	No	No	No	No	No

TABLE I. CHARACTERISTICS OF ONLINE INSTRUCTION PROGRAMS (cont.)

		W.I.S.	LIRS/CAS	CRS
d. Special Training Needed to Operate	Yes	Yes	Yes	Yes
14. Facilities Employed	Workroom (contains terminals)	Varies	Workroom containing terminals	
15. Instruction Materials				
a. Specialized, integral part of course	Yes	Yes	No, supportive	
b. Types of Materials	Brief manual	LIRS: booklet CAS: manual	Brief description of database contents	
c. Production Source(s)	All in-house	all in-house	all in-house	
d. Ease of Content Preparation	Straightforward	Moderately complex	Complex	
e. Ease of Use by Instructor	Transferable	N/A	N/A	
f. Ease of Use by Student	Partially self-instructional	Self-instructional	Self-instructional	
g. Update Frequency	No fixed schedule	No fixed schedule	No fixed schedule	
h. Initial Preparation Time	1½-2 mos., several people	LIRS for ERIC: 5 mos., 3-5 persons est. + 40 hrs. each for 15 librarians est.	Contractor: 9 mos. CRS: 9 mos., 1/2 time, 1 person	
i. Initial Preparation Cost	\$2500-\$5000 est. per manual	LIRS: \$14,000 est. + \$10,000 for librarians est.	CRS: \$5600 Contractor: \$50,000	
j. Update Preparation Time	N/A yet	N/A	CRS: 2 mos., 1/2 time, 1 person est. + contractor	
k. Update Preparation Cost			CRS: \$1200 est Contractor: \$25,000	
l. Pilot/Field Test, Evaluation	No	LIRS: Yes CAS: Yes	Yes	

TABLE I. CHARACTERISTICS OF ONLINE INSTRUCTION PROGRAMS (cont.)

	LIRS	CSIM	DTIC	NIM	UDRI	Pitt
IV. EVALUATION/FEEDBACK MECHANISMS						
16. Evaluation Instruments Developed, Used	Intro: 2-Pg. questionnaire, Others: 1-Pg. questionnaire	1-Pg. questionnaire	2-Pg. questionnaire	Intro, Advanced: 2-Pg. questionnaire for each	Intro: 5-Pg. questionnaire Profiles: 3-Pg. questionnaire	2-Pg. questionnaire
17. Student Achievement Monitoring						
a. Pre-test	No	No	No	Yes (MEDLEARN)	No	No
b. Interim Tests/ Problems	No	Yes	Yes	Yes	Yes	Yes
c. Post-test	No	Yes	No	No	Intro: Yes	No
18. Instructor Follow-up	Not directly	No	Not directly	Yes (service desk)	No	No
19. Instructor/Organization Post-training Evaluation	No	No	No	No	No	No
20. User Groups						
a. Existence	Indirectly, ...	No	Yes	Yes	No	No
b. Meeting Frequency	Varies	N/A	Per region, annually	Per region, annually	N/A	N/A
c. Meeting Usefulness	Probably positive	N/A	Positive	Positive	N/A	N/A

TABLE I. CHARACTERISTICS OF ONLINE INSTRUCTION PROGRAMS (cont.)

	H.I.S.	LIRS/CAS	CRS
IV. EVALUATION/FEEDBACK MECHANISMS			
16. Evaluation Instruments Developed, Used	None	No	No
17. Student Achievement Monitoring	No	N/A	No
a. Pre-test	No	N/A	
b. Interim Tests/Problems	Yes	N/A	Yes
c. Post-test	No	N/A	No
18. Instructor Follow-up	No	N/A	N/A
19. Instructor/Organization Post-training Evaluation	No	No	No
20. User Groups			
a. Existence	No	Indirectly, Yes	No
b. Meeting Frequency	N/A	Varies	N/A
c. Meeting Usefulness	N/A	Probably positive	N/A

CRITIQUE OF THE PROGRAMS

One program can't be considered better or worse than another because of the differences among them. Implicitly or explicitly, they have different training purposes. They address different command languages and different databases. Often they are directed at different target groups. Experience from the programs, however, does yield guidelines that can be generally helpful for future program development.

It appears that two essential elements of any instruction program are printed materials and hands-on practice. User need for manual specificity, depth, and written analysis can vary widely. H.I.S. and CRS experience should be a reminder that brief is beautiful for some user groups. A serious problem arises in a situation like UDRI's where database complexity dictates a comprehensive manual but students lack experience to cope with such a text. The question "What is enough hands-on time?" is not an issue in the ONTAP and CRS programs (if money isn't a problem for ONTAP students) because the programs are self-paced. Pitt believes that the 10 to 12 hours of practice its students receive, accompanied by instructor assistance as needed, enables students to perform independently in their own work environments. CSLIM, DTIC, and NLM experiences indicate that 2 hours per student or 2-student group is not adequate if database learning is involved; 4 to 5 hours may be on the borderline of adequacy.

It is fashionable to frown on lectures as an antiquated mode of presentation. Its pervasiveness is probably partially attributable to instructors' lack of familiarity with other media, but also partially because of the additional investment of time (and hence cost) required to incorporate slides or videotapes, for example, into instruction programs. The objective to be accomplished and the audience must be kept in mind. CRS's 14-minute introductory videotape doesn't have the sophistication of a CBS documentary

but it is informative, holds attention, and accomplishes the objective of introducing the viewer to SCORPIO databases. Videotapes could communicate the search process and system responses much better than lectures. The use of instructional television (ITV) is widespread and is likely to be as effective in teaching the use of online databases as it is in other areas.⁵ For content subject to change and when portability (e.g., borrowing by students, exchange with other institutions) is desired, tape/slide modules could be developed. A comprehensive British evaluation of tape/slide guides for library instruction recommends this methodology as low in cost, easy to use in program preparation, easy to operate, and robust in handling.⁶ Sound tapes alone are being tested by H.I.S. for self-paced learning; listening is integrated with a printed manual and hands-on practice. Slides are being effectively used by UDRI to reinforce or illustrate lecture content. The slides range from prose to tables to line drawings and make good use of color and different type sizes. In all instances where a technology is used, it is not used in isolation. As is suggested in the British study, "it may be that interaction between tutor and student, but in a structured setting, is still the most important ingredient." The lecture isn't obsolete, but an online instruction program that relies on lecture alone for more than 30-35% of the contact time with students probably needs to be rethought.

Although the computer has had the potential to individualize instruction since the mid-1950's, and although CAI/CBI/CMI systems have been developed, utilization is still limited.⁷ A tabular summary of the major systems currently available to course writers is given in Table II (page 78). In an excellent review of the CAI state-of-the-art, Jurg Nievergelt cautions that more skill is required to use the medium effectively than is required by any other medium.⁸ He estimates that an author must plan to spend between 10 and 100 hours to produce one hour of student contact time, the realistic average for several authors working collaboratively being 100 hours. He anticipates

TABLE II. MAJOR CAI/CBI AND CMI SYSTEMS IN CURRENT USE*

PROJECT	DEVELOPER	TYPE	DESCRIPTION	COMPONENTS	SERVICES	TYPE OF STUDENT	CURRICULUM
Automated Instructional Management System (AIMS)	New York Institute of Technology	CMI	Uses any course materials designed for behavioral objectives	Information on objectives, students, curriculum, and facilities, instructional strategies, tests, and feedback	Evaluation of student progress, prescriptions, and empirical validation and optimization of instruction	Any	Math
Wisconsin System of Instructional Management (WIS-SIM) designed for Individually Guided Instruction (IGE)	Wisconsin Research and Development Center for Cognitive Learning	CMI	Utilizes specific instructional objectives through instructional programming model for individual student, establishes mastery levels	Instructional programming model, measurement and evaluation model, and multi-unit school	Criterion-referenced tests, achievement profiling, diagnosis, prescription, and instruction	Elementary	Reading, Math, Science
Individually Prescribed Instructional Management Information System (IPI/MIS)	Learning Research and Development Center at University of Pittsburgh assisted by Research for Better Schools	CMI	Uses IPI curricular materials which employ detailed instructional objectives, methods, and materials, establishes mastery level	Detailed objectives, methods, and materials, determination of individual competence, continuous evaluation, and student performance monitoring	Diagnoses and prescribes. Collects and processes information, competence, performance, and progress of each student	Elementary	Math
Instructional Management System (IMS)	System Development Corporation Southwest Regional Lab	CMI	Adapts to any curriculum which has clear, specific learning objectives	Frequent testing, profiling, individual study recommendations, and summary reports on all tests	Assists with pacing, grouping, sequencing, and individualization	Any	Reading, Math, Drama, Public Speaking, Art, Music
Program for Learning in Accordance with Needs (PLAN*)	American Institutes for Research and now managed by Westinghouse Learning Corporation	CMI	Employs prescribed behavioral objectives and Teaching-Learning Units (TLUs)	Behavioral objectives, Teaching-Learning Units, criterion-referenced tests, guidance, individual planning, and teacher development	Monitoring and supervising, test scoring, diagnosis, prescriptions, individualization, in-service for teachers	Any	Utilizes existing materials in Language Arts, Social Studies, Math, Sciences
Interactive Training System (ITS)	International Business Machines Corporation	CAI	Allows teacher to write course without requiring detailed programming knowledge	Course structuring feature, author plans and writes course, student sessions may be scheduled or taken at random, monitor available to answer questions	Develops courses, teachers write courses, any mode of presentation is permitted	Any	Any course
Programmed Logic for Automatic Teaching Operation (PLATO)	University of Illinois, now managed by Control Data Corporation	CAI	Integrates knowledge, fact, information, and education developing systems through audio and visual means	Teacher-designed lessons, evaluates and monitors student performance	Any CAI mode can be employed, develops courses and units, especially helpful with simulations and game playing, revision and editing at any time	Any	Utilizes a wide range of subject matter formats
Stanford Project	Stanford University	CAI	Uses programs and materials with structured curriculum	Lessons found in materials, teacher-developed, monitors and evaluates student performance	Revisions and editing at any time, but for problem-solving and drill-practice, schools usually contract for services	Any	Applicable to reading, arithmetic, logic, algebra, problem-solving
Time-Shared, Interactive, Computer-Controlled, Information Television (TICCIT)	MITRE Corporation	CAI	Utilizes all four modes of CAI to provide lessons for students and utilizes media	Designs lessons for individuals, employs all four CAI modes, evaluates and monitors student performance	Revision and editing of program, monitoring, and evaluating student progress utilizing all four modes of CAI	Any	Utilizes a wide range of existing subject matter formats

* Excerpted from: Fred L. Splittgerber, "Computer-Based Instruction: A Revolution in the Making?" *Educational Technology*, 19:1 (Jan. 1979) 20-26.

that the cost of CAI/CBI programs will decline as CAI/CBI becomes a mass consumption item at which time the cost may be no greater than that of ITV. CAI programs are presently limited in the assistance they provide to student questions. In Nievergelt's words, "the limitations of what you can program show up starkly and painfully." CRS's PLATO program covers the basic elements of the SCORPIO language and the contents and retrieval options of four databases straightforwardly and in an interactive way with frequent questions the student must answer that holds student interest. Branching limitations are quickly evident in HELP responses. Sophisticated applications of SCORPIO and complex search strategy possibilities are not included in the programs. CRS has demonstrated that CAI/CBI can be successfully used for an introductory online instruction course but it is not likely to be realistically applicable to advanced content.

At probably half the cost of CAI/CBI programs, the ONTAP methodology, particularly as implemented by CAS, may be a viable approach to giving students who plan to be or are searchers a range of experience from the introductory to the advanced level. Although the 16 user questionnaires that were obtained are too few for definitive analysis, more hands-on practice and more search strategies/case studies/prototype searches appear clearly as desiderata (see Appendix D). Perhaps other database producers can be encouraged to follow the CAS lead. On the assumption that a \$15/connect-hour cost is quite reasonable, would-be students may have to sell employers on the cost effectiveness of this mode of learning.

IMPLICATIONS FOR DTIC INSTRUCTION PROGRAMS

This section addresses instruction program design features that DTIC should consider in formulating plans for future programs. The program elements are discussed in the order used earlier, namely

1. Purposive documentation
2. Education program
3. Resources
4. Evaluation/feedback mechanisms

1. Purposive Documentation

DTIC should provide a clearer statement of basic program goals for its introductory and advanced courses than exist at present. The existence of these separate courses, augmented by several abbreviated formats, indicates that different end results are expected.

The NLM practice of specifying behavioral outcomes expected of students on a lecture-by-lecture basis is initially laborious to do, but the result is beneficial for both instructors and students. Course designers and instructors have a clear, unambiguous direction that proves easier to work with for course development than if it were not present. By phrasing objectives in performance measurement terms and sharing them with students, the students know clearly what they must achieve. The documentation also permits all parties to the instruction program, including external critics and other organizations that may wish to provide instruction, to review and evaluate it and, perhaps, make constructive suggestions for improvement.

Criteria -- particular outcomes designers want to achieve -- are developed in conjunction with behavioral objectives. Minimally, they should answer the question: How much of the performance attainment must be attained? Where quantities can be specified, such as student/instructor ratio, number of hands-on practice hours, number of search strategies to be formulated, single numbers or a numeric range should be specified. An important facet of

criteria development is that the criteria accurately characterize course desiderata. Factors that are measureable but are not important to the goal of the course or are not descriptive of student achievement have small value and should not be employed.

2. Education Program

The multi-course structure is a product of both wisdom and necessity. Except for the academic environment, students in other situations are usually employed. They either cannot, or believe that they cannot, be away from their work for more than one week at a time. Additionally, short courses almost always are intensive, requiring 7 or 8 hours of continuous concentration per day. Pitt's course includes two 2 or 3 hour evening sessions as well. People become fatigued in these situations even when the presentation is varied through the use of different media and hands-on practice. Strain among students often appears after 2½ to 3 days, and the effect on learning and retention during a longer period, while not known, may be serious. Thus, the course subdivision that DTIC now has should be continued.

The content of DTIC's two regular courses and their modifications bears re-examination. The success LIRS has found with modularization and NLM's experience that will probably result in optional modules at the advanced level appears applicable to DTIC, particularly since public access is introducing clients with different, less subject intensive, needs than those of the more homogeneous DOD community. An introductory course consisting of a 4-day format is suggested to cover the fundamentals of the command language, the TR and CF report files, the WU file, and the PP file. The overall objective of the course could be to provide a functional understanding of, and experience with, the databases to enable students to do query analysis and online retrieval at their work stations.

DTIC should then consider the development of advanced modules that

focus (a) on the command language and (b) on each of, or groups of, the databases. The modules could be 1 or 2 days in length as needed. A module is also needed for the Independent Research database. These modules could be offered back-to-back over a one-week period or, based on client demand, some could be offered more frequently than others. The module approach is suggested to more closely accommodate to client needs and to indirectly assure the attentiveness of students. DTIC might wish to institute a requirement that participants for advanced modules have 3 or 6 months or some other period of database and system experience prior to enrollment. DTIC might also wish to prepare a self-test by which those wishing to attend advanced modules could determine their readiness for the modules.

Cutbacks in travel expenses can be expected to more seriously impair the ability of people who should receive instruction from attending courses conducted in one or a few locations. On the assumption that instruction programs will continue to be lecture based for at least the next few years, the number of sites at which the instruction program is made available should be appreciably increased. Locations could be announced with an understanding that assurances of attendance below a certain number by a certain date would cancel the course.

A trend for the past several years has been the development of education programs by database producers. FTD has elected a different option, namely contracting for instruction program services. Since the DTIC databases are not as complex as several of FTD's, the problem of ensuring full contractor understanding of the database structures and contents and characteristics of the client communities is less severe. The contract option nevertheless requires that the contractor have a thorough knowledge of the DTIC system and that a close working relationship develop between contract and DTIC personnel so that instructors can keep apprised of system changes.

The issue of an instruction program fee becomes increasingly important if instruction is to be given extensively in the field. Insofar as DTIC is a federal agency that wants the public to utilize its databases, a high fee seems inappropriate. However, people tend to place little value on what they get without cost. Therefore a modest fee of \$50 or \$60 for the introductory course and \$30 for a 2-day module seems reasonable, particularly if locational dispersion reduces student travel costs and the fee includes a workbook or manual.

3. Resources

Instructional experience and student feedback strongly suggest that all instruction programs incorporate online hands-on practice. The weight of evidence points to sufficient terminals so that each participant can have a terminal or, as a minimum, a terminal can be shared by no more than 2 persons. Some people are terminal shy and, even in 2 or 3 person groups, they avoid practice. This may prevent others from seeing their slowness or mistakes, but this does them a longer term disservice because they may not be able to function when they return to their workplaces. A \$600 or \$800 or \$1000 investment per terminal that may be used by 20 to 30 to 40 people per year in a classroom reduces the per-student investment to nominal amounts. Arrangements can be made to rent terminals at field locations. Most students seem to interact better with terminals having CRTs, but since many work-station terminals do not have CRTs, a mixture would be more economical and may be more realistically instructive to students.

The optimum student/instructor ratio is not yet known. Experience shows that 20/1 does not permit the instructor to meet students' needs. A 3/1 or 4/1 ratio appears to make more instructor time available than students need during most of a course (though not at the very beginning). A 10/1 or 12/1 ratio may be the most cost effective for DTIC on the assumption that most trainees are already users of an online system. They are likely to find the

DTIC command language a little strange because it differs from the one they already know, but they also know what they must learn. The DTIC databases are sufficiently similar in structure to other bibliographic databases as to again permit most students to learn through self-teaching. In such an environment, one instructor should be able to attend to all of the questions posed by 10 to 12 students. This is another element of an instruction program where spreading a resource too thinly may quantitatively indicate cost effectiveness but it is likely to impact the objective of producing self-reliant system users.

Instructors uniformly agree on the value of printed tutorial materials regardless of the instructional mode used for knowledge transfer. Experience indicates that different formats are acceptable to different audiences. As other agencies have done, DTIC has found it advisable to produce both long and short versions of manuals, i.e., the "Self-Training Module for Users of the Defense RDT&E On-Line System" dated September 1979, a companion volume for dialup clients dated October 1980, and the "Retrieval Mini-Manual" dated December 1979 as well as a quick reference booklet, "Defense RDT&E Diverse Dial-Up On-Line System Reference Guide" dated October 1980. All three levels of description and explanation are likely to be needed in the future.

As has been noted previously, DTIC's future dialup clientele can be expected to be much more heterogeneous than it was when access to DTIC's databases was limited to DOD agencies and contractors via dedicated terminals. Some clients will probably have little knowledge of technical information systems and will want to be able to use a few basic commands for limited access to the system. A Mini-Manual type of training and reference text will probably meet their needs as well as a need for quick verification of a command or a code by more sophisticated searchers. Information professionals performing as search intermediaries usually want as much detailed illustration of search strategies and search alternatives as a database producer or vendor is willing to supply. This kind of text could be written so as to be employed in

conjunction with course delivery as NLM does with its Workbooks. Alternatively, the detailed manual could contain material augmenting that covered during the course and possibly serve an encyclopedic function.

Use of a variant of NLM's and Pitt's mode of producing printed materials is highly recommended. The ubiquitous word processor was initially designed for this type of production task.

The nature of the course material suggests study facilities that provide adequate table or desk space for the various manuals, thesauri, search aids, and notebooks that must be examined, learned, and used during the course of the instruction program. The amount of surface provided for students in DTIC's current classroom requires that students stack documents on top of each other and use the floor and their laps for overflow. Furthermore, chairs are less than comfortable for long sitting periods and are particularly skimpy for large men and women. DTIC's classroom is a good example of an excessively cramped facility. The instructor has little room to move about for chalkboard or chart use. If slides or transparencies were to be introduced into lectures, the equipment would further reduce student work space as well as introduce wires likely to be tripped over. Functional designs, furniture, and layouts are being developed by manufacturers of office and education equipment. Whether or not their products are bought, they can be examined for ideas that could be incorporated into study facilities that should be viewed as learning laboratories.

The lecture mode of program delivery presently in use needs at least some integration with other media. (See Appendix C that presents advantages and disadvantages of several instruction methodologies.) As a minimum, command language operations, search strategies, and system responses could be exemplified on slides or transparencies. Students should have copies of these visuals as separates or in a workbook for note taking. DTIC could experiment with the development of tape/slide modules or TV film for instruction about

DTIC's databases. These could be used instead of lectures or could be made available for student borrowing as refreshers or in advance of lectures, thereby using the face-to-face time with an instructor for question/answer discussion. Computer systems often go down during instruction when they are most needed. It is suggested that backup material be developed on slides, transparencies, or film that can adequately replace all online demonstrations should the need arise. Alternative student work activities must also be developed as substitutes for online practice sabotaged by down time.

CAI programming is not recommended for DTIC at this time because (a) it is too expensive to develop for limited numbers of users and (b) it is not at the off-the-shelf level yet for advanced users. The ONTAP program does warrant investigation by DTIC. It is suggested that DTIC explore the activities undertaken by the Chemical Abstracts Service to implement ONTAP CHEMNAME. It is believed that many information professionals who will be using DTIC databases and who need a DTIC refresher, as well as end-users in DOD, are likely to find an ONTAP-like program useful. Implementation of such an instruction program could alleviate the need for, and expense of, field instruction programs.

4. Evaluation/Feedback Mechanisms

DTIC is already using two important evaluation mechanisms, a course evaluation form completed by students and periodic user group meetings.

Although it might be desired that the evaluation form more adequately provide for written comments, it seems sufficiently adequate to retain. The main problem with an evaluation instrument administered immediately after a course is that students have not yet had the opportunity to apply what they have learned in a real situation. Evaluation would be much more useful if it could be obtained after the student has used the system for 4 to 6 months. Therefore, it is recommended that an evaluation instrument be developed with

questions similar in format to those of ASIS and adequate space for written comment. User group meetings may be the best forums at which to distribute (and collect) the forms. The form could also be a periodic insert in DTIC's newsletter with a short article promoting the evaluation.

DTIC might also wish to adopt a pre-test mechanism for attendees of advanced courses similar to that of NLM. The pre-test is mailed to persons wishing to attend one or more of the advanced modules. It is a means by which potential students can judge whether they have acquired enough skill with the system to qualify for the advanced class, and it can identify areas of weakness. The tests are not sent to NLM for grading so they do not add to the instructor's workload.

DTIC could systematize evaluative information acquired at its customer service desk to feed back user problems and experience to instructors, whether instructors are DTIC or contract personnel. Ideally, it is believed that instructors could benefit from spending even a small amount of time per month in a customer service capacity. This is the least artificial means of obtaining feedback and evaluative information and it should be utilized.

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APPENDIX A

DATA COLLECTION FORMS

INTERVIEW SCHEDULE

INFORMATION SOUGHT ABOUT PROGRAMS/COURSES THAT TEACH ONLINE USE OF COMPUTER-STORED DATABASES, FILES

1. What types of courses are offered? (beginning, intermediary, advanced)
2. What are the durations of the courses?
3. When are they given? (dates, particular times of the year)
4. What are costs of the courses to participants?
5. Are courses subsidized? By whom? By what percentage and dollar amount?
6. What are the purposes of the courses?
(what level of competency is it intended to provide?)
7. What class size is preferred? What is the preferable class size limit?
8. What course materials are used? Who prepared them?
9. What teaching methodologies are used?
(lecture, discussion, transparencies, programmed texts, CAI,
hands-on, etc.)
10. What is the size, composition (background) of the teaching staff?
11. What are the typical education, experiential backgrounds of students?
12. What information content is taught?
13. How many hours / What proportion of time is allocated to hands-on learning?
14. What terminals are used?
(keyboard only, CRT + keyboard, whose manufacture, models)
15. How many students are assigned per terminal during hands-on sessions?
16. What kinds of assignments are performed during hands-on sessions?
(drill & practice, search queries, parts of queries, independent project, etc.)
17. Is a formal student evaluation performed?
(copy of evaluation instrument)
18. Is there a formal feedback mechanism some time after (6-12 mo.) the program/course is completed?
(copy of feedback instrument)
19. Particularly if 17, 18 not done, how is program/course effectiveness assessed?
20. What assistance is given in addition to courses (i.e., after courses) to help with problems students encounter in the use of databases on the job?
21. What program changes/improvements are being considered/planned/
desired? Why?

RWS 9/80

ON-LINE EDUCATION QUESTIONNAIRE

1. Whose programs for teaching the online use of databases have you attended?

Please indicate when you had the education/training by marking the appropriate boxes. Please note ALL programs that you have had.

Program	Approximately how long ago did you have the program?					
	In 1980	In 1979	In 1978	In 1977	In 1976	1975 or earlier
1. BRS - Introductory						
2. BRS - Advanced						
3. Lockheed - Introductory						
4. Lockheed - Advanced						
5. SDC - Introductory						
6. SDC - Advanced						
7. NLM - MEDLINE						
8. LEXIS						
9. OCLC						
10. DTIC (formerly DDC)						
11. DOE/RECON						
12. NASA/RECON						
13. CISTI - CAN/OLE						
14. Cuadra Associates						
15. On-the-job, formal						
16. On-the-job, informal						
17. University - short course (1 week)						
18. University - short course (2 weeks)						
19. University - regular course (qtr, semestr)						
20. Other (pls specify)						
21. Other (pls specify)						
22. Other (pls specify)						

2. On a scale of 1 to 10, please rate the programs you have had on how well they prepared you to do online searching/retrieval, by circling the appropriate rating number below for each program.

"1" signifies very inadequate preparation

"10" signifies preparation that permitted you to do searches on your own with a high degree of confidence and proficiency

Space is provided below for up to 8 programs. Please use the numbers given in the left column of Question 1 on the lines below.

Program	Inadequate										Adequate									
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Program	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Program	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Program	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Program	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Program	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Program	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Program	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10

3. What teaching/presentation methodologies do you like? Dislike?
(e.g., lecture, films, transparencies, tape-slide, role playing, discussion)

- 2 -

4. What aspects of the contents of the programs did you find particularly helpful?

5. What program content did you consider NOT adequate? (i.e., you wanted more of)

6. What content was NOT included that you would have wanted?

7. How many class hours or workshop days do you think are needed to gain a working knowledge of

A single database? _____ Two related databases? _____

8. Which of the following alternatives do you consider the best to acquire searching proficiency? (Please circle the appropriate letter)

- a. A single course followed by on-the-job practice
- b. A beginning course, on-the-job practice; 6-12 months later, an advanced course
- c. A beginning course, on-the-job practice; 6-12 months later, an advanced course on the command language and system and advanced database courses
- d. Alternative a and periodic 1-day updates on system + databases
- e. Alternative b and periodic 1-day updates on system + databases
- f. Alternative c and periodic 1-day updates on system + databases

9. Which organizations do you think are most able to provide high-quality education/training in the online use of databases?

	Poor				Good
Database producers	1	2	3	4	5
Computer system vendors	1	2	3	4	5
Academic - library schools	1	2	3	4	5
Academic - adult education service	1	2	3	4	5
Library network/service organizations	1	2	3	4	5
Consultants, information brokers	1	2	3	4	5
Other (please specify)	1	2	3	4	5

AD-A101 460

OFFICE OF PERSONNEL MANAGEMENT WASHINGTON DC
STUDY OF ONLINE INSTRUCTION METHODOLOGIES FOR THE DTIC TRAINING—ETC(U)
FEB 81 R W SWANSON

F/6 5/9

UNCLASSIFIED

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2 OF 2
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END
DATE
FILED
8-8-81
DTIC

10. What kinds of teaching materials do you prefer?

11. Are you likely to buy a self-teaching manual instead of attending a program?

Yes No Maybe

12. Are you likely to pay for a self-paced computer-assisted instruction program instead of attending a more traditional classroom program?

Yes No Maybe

13. How much online searching do you do?

Please circle the appropriate letter below.

a. Over 20 hrs/wk	d. 5-10 hrs/wk
b. 15-20 hrs/wk	e. 3-5 hrs/wk
c. 10-15 hrs/wk	f. 1-3 hrs/wk
g. don't do searching	

14. How frequently do you use the vendor systems listed below?

Please note ALL that apply

	4 or more hrs/day	2-4 hrs/day	0-2 hrs/day	approx 6-8 hrs/wk	4-6 hrs/wk	2-4 hrs/wk	occasionally
BRS							
Lockheed							
SDC							
OCLC							
MEDLINE							
N Y Times							
NASA/RECON							
DOE/RECON							
LEXIS							
WESTLAW							
CAN/OLE							
DTIC							
In-house files							
Other (specify)							

15. What type of organization do you work for?

a. For profit (not a DOD contractor)	f. Federal govt. (non-military)
b. For profit (DOD contractor)	g. Federal govt. (military)
c. For profit (information broker)	h. State, local government
d. Not for profit (non-academic)	i. Self employed
e. Not for profit (academic)	

16. Do you have any other comments, suggestions that could help designers and developers of future education/training programs?

APPENDIX B

COURSE EVALUATION QUESTIONNAIRES

Lockheed Information Retrieval Service	95
Defense Technical Information Center	98
National Library of Medicine	100
University of Dayton Research Institute	104
University of Pittsburgh	112
American Society for Information Science ...	114
United States Government	116



INFORMATION RETRIEVAL SERVICE

- 95 -

DIALOG SYSTEM SEMINAR

Name _____ Phone _____

Title/Division _____ User No. _____

Affiliation/Co. _____

Where did you learn about Lockheed DIALOG?

Professional Meetings () Advertisements () Colleagues ()

Other (specify) _____

Please indicate below your experience level with online information retrieval systems.

DIALOG _____ 0 to 10 hrs. _____ 10 to 25 hrs. _____ over 25 hrs.
_____ 0 to 10 hrs. _____ 10 to 25 hrs. _____ over 25 hrs.
_____ 0 to 10 hrs. _____ 10 to 25 hrs. _____ over 25 hrs.
_____ 0 to 10 hrs. _____ 10 to 25 hrs. _____ over 25 hrs.

What subject areas are most important to you?

Biomedicine	(<input checked="" type="checkbox"/>)	Food/Agriculture	(<input type="checkbox"/>)	Physical Sciences/	
Business	(<input type="checkbox"/>)	Government	(<input type="checkbox"/>)	Engineering	(<input type="checkbox"/>)
Chemistry	(<input type="checkbox"/>)	Humanities	(<input type="checkbox"/>)	Social Science	(<input type="checkbox"/>)
Education	(<input type="checkbox"/>)	Patents	(<input type="checkbox"/>)		

Other _____

What databases would you like to see added to the DIALOG system?

(cont.)

(DIALOG, LOCKHEED INFORMATION RETRIEVAL SERVICE, pg. 2)

Training Location _____

Instructor _____ Date _____

How would you rate the content of this session on a scale of 1 to 10?

needs improvement	satisfactory	good	excellent						
1	2	3	4	5	6	7	8	9	10

How would you rate the presentation?

needs improvement	satisfactory	good	excellent						
1	2	3	4	5	6	7	8	9	10

What portion(s) of the agenda did you find most useful?

What suggestions would you make for improving the session?

Additional comments on the training session?

Additional comments or suggestions for the DIALOG retrieval service?

We appreciate your comments, and read them all. They play an important part in developing training to suit your needs and in continually improving the DIALOG service. Thank you for your time.

DIALOG Business Training Session

The DIALOG Customer Services Staff is attempting to be responsive to the training needs of users. Your comments below will assist us in this endeavor.

1. Name: _____ DIALOG Instructor: _____
 Organization: _____ City: _____
 Phone No. _____ Date: _____
 User No. _____

2. Please indicate below your experience level with online information retrieval systems.

DIALOG	0 to 10 Hrs.	10 to 25 Hrs.	over 25 Hrs.
_____	0 to 10 Hrs.	10 to 25 Hrs.	over 25 Hrs.
_____	0 to 10 Hrs.	10 to 25 Hrs.	over 25 Hrs.
_____	0 to 10 Hrs.	10 to 25 Hrs.	over 25 Hrs.

3. Please indicate your feeling regarding the level of today's session by circling a number.

1	2	3	4	5	6	7	8	9	10
Too				About the					
Elementary	_____			Correct Level	_____				Too
									Advanced

4. Please indicate your feeling regarding the pace of today's session by circling a number.

1	2	3	4	5	6	7	8	9	10
Delivery	_____			About the					
Too Slow	_____			Right Pace	_____				Delivery
									Too Fast

5. How would you rate the presentation?

1	2	3	4	5	6	7	8	9	10
Needs	_____			Satisfactory	_____				
Improvement	_____								Excellent

6. Would you be interested in attending any DIALOG Training Sessions on other topics? These would be similar to today's session in that they would be one-half day, would cover a DIALOG database or group of databases and would be taught by the DIALOG Customer Services staff (as opposed to a person from the database producer). If so, please indicate your preference on these topical sessions below.

Patents Life Science Engineering/Physics
 Environment Food/Agriculture Education/Social Science
 Other: _____

7. Any other comments on today's session or the DIALOG service:

Thank you for your time. Please return this form to the DIALOG instructor.

Please continue comments on the reverse side.

DEFENSE DOCUMENTATION CENTER
DEFENSE RDT&E ON-LINE SYSTEM TRAINING EVALUATION

You have just completed a training program to learn to operate the Defense RDT&E On-Line system. DDC is interested in your constructive comments concerning course content, format and presentation so that future instruction can meet your needs. We would appreciate your frankness and cooperation in completing this evaluation.

PART I			
PRELIMINARY			
A. TRAINING RECEIVED			
1. TYPE OF TRAINING		2. LEVEL OF TRAINING	
<input type="checkbox"/> RETRIEVAL <input type="checkbox"/> INPUT		<input type="checkbox"/> BASIC <input type="checkbox"/> REFRESHER <input type="checkbox"/> INTERMEDIATE <input type="checkbox"/> ADVANCED	
3. DATA BASE(S)		4. LENGTH OF COURSE	
<input type="checkbox"/> TR FILE (1473) <input type="checkbox"/> WU FILE (1498)		<input type="checkbox"/> PP FILE (1634) <input type="checkbox"/> IR&D (271)	
<input type="checkbox"/> 3 DAYS <input type="checkbox"/> 5 DAYS		<input type="checkbox"/> 10 DAYS <input type="checkbox"/> 2 WEEKS	
B. YOUR CURRENT POSITION			
1. ORGANIZATION			
<input type="checkbox"/> DoD <input type="checkbox"/> GOVERNMENT <input type="checkbox"/> CONTRACTOR <input type="checkbox"/> IAC <input type="checkbox"/> OTHER			
2. TITLE OF YOUR POSITION			
<input type="checkbox"/> LIBRARIAN <input type="checkbox"/> RESEARCH SPECIALIST		<input type="checkbox"/> TECH. INFO. SPECIALIST <input type="checkbox"/> SCIENTIST	
<input type="checkbox"/> COP PRINTER <input type="checkbox"/> 800 PRINTER		<input type="checkbox"/> CLERK-STENO <input type="checkbox"/> PROGRAMER	
C. REMOTE TERMINAL INFORMATION (Present or on order)			
1. EQUIPMENT		2. LOCATION OF EQUIPMENT	
<input type="checkbox"/> U-100 <input type="checkbox"/> U-200		<input type="checkbox"/> LIBRARY <input type="checkbox"/> COMPUTER ROOM	
<input type="checkbox"/> NASA/RECON <input type="checkbox"/> DIALOG <input type="checkbox"/> SDC <input type="checkbox"/> ORBIT		<input type="checkbox"/> STAFF AREA <input type="checkbox"/> OTHER	
3. OTHER ON-LINE SYSTEMS			
4. WHICH ONE(S) CAN YOU OPERATE?			
5. DID THIS KNOWLEDGE <input type="checkbox"/> HELP <input type="checkbox"/> HINDER YOUR LEARNING THE DDC SYSTEM?			
PART II			
COMMENTS ON TRAINING			
A. TRAINING MATERIALS			
1. REFERENCE GUIDE		ADEQUATE	GOOD
2. OPERATOR'S MANUAL			
3. REFERENCE TOOLS			
4. VISUAL AIDS			
5. TRAINING ROOM			
COMMENTS			
B. OPERATION OF EQUIPMENT			
1. U-100/U-200		EASY	DIFFICULT
2. KEYBOARD			
3. PRINTER			
4. SOUND PAGE RECORDER			
5. TAPE CASSETTE			
COMMENTS			
C. SOFTWARE FUNCTIONS AND COMMANDS			
COMMENTS		<input type="checkbox"/> EASY	<input type="checkbox"/> DIFFICULT
		<input type="checkbox"/> NEEDS IMPROVEMENT	

D. HANDS-ON PRACTICE		<input type="checkbox"/> HELPFUL	<input type="checkbox"/> NOT NEEDED	
COMMENTS				
E. DATA BASE COVERAGE		ADEQUATE	GOOD	NEEDS IMPROVEMENT
1. TR FILE (1473)				
2. WUIS (1498)				
3. PP FILE (1634)				
4. IR&D (271)				
COMMENTS				
F. SECURITY COVERAGE		<input type="checkbox"/> ADEQUATE	<input type="checkbox"/> GOOD	<input type="checkbox"/> NEEDS IMPROVEMENT
COMMENTS				
G. LENGTH OF COURSE				
1. <input type="checkbox"/> LEAVE AS IS		<input type="checkbox"/> LONGER (No. of days _____)	<input type="checkbox"/> SHORTER (No. of days _____)	
2. SUGGESTED ADDITIONAL SUBJECTS:				
3. WHAT WOULD YOU OMIT?				
H. ADDITIONAL TRAINING NEEDED				
1. <input type="checkbox"/> YES		2. <input type="checkbox"/> REFRESHER	3. <input type="checkbox"/> IN 3-6 MONTHS	
<input type="checkbox"/> NO		<input type="checkbox"/> INTERMEDIATE	<input type="checkbox"/> IN 6-10 MONTHS	
<input type="checkbox"/> ADVANCED				
PART III EVALUATION OF INSTRUCTOR				
INSTRUCTOR'S NAME		DATE		
1. ORGANIZATION OF SUBJECT MATTER		<input type="checkbox"/> ADEQUATE	<input type="checkbox"/> GOOD	<input type="checkbox"/> NEEDS IMPROVEMENT
2. DELIVERY OF SUBJECT MATTER		<input type="checkbox"/> ADEQUATE	<input type="checkbox"/> GOOD	<input type="checkbox"/> NEEDS IMPROVEMENT
3. ATTITUDE OF INSTRUCTOR		<input type="checkbox"/> FRIENDLY	<input type="checkbox"/> HELPFUL	<input type="checkbox"/> DISTANT
4. ATMOSPHERE		<input type="checkbox"/> FORMAL	<input type="checkbox"/> INFORMAL	
5. PRACTICE PROBLEMS		<input type="checkbox"/> HELPFUL	<input type="checkbox"/> ADEQUATE	<input type="checkbox"/> NOT NECESSARY
COMMENTS				
PART IV EVALUATION OF COURSE				
<input type="checkbox"/> ADEQUATE		<input type="checkbox"/> GOOD	<input type="checkbox"/> VERY GOOD	<input type="checkbox"/> EXCELLENT
COMMENTS				

(NATIONAL LIBRARY OF MEDICINE, QUESTIONNAIRE FOR INITIAL TRAINING COURSE)

ON-LINE SERVICES TRAINING

Course Evaluation

The National Library of Medicine would greatly appreciate your comments, suggestions, and criticisms on the following:

Course content:

Sequence of topics:

Hands-on exercises and follow-up discussions:

(National Library of Medicine, Initial On-Line Services Training)

Course evaluation -- page 2

Hand-outs, written exercises, and other instructional aids:

Instructors:

Any additional comments:

Name (optional) _____

Dates of training course _____

(NATIONAL LIBRARY OF MEDICINE)

ADVANCED ONLINE TRAINING CLASS EVALUATION

We appreciate your comments on the training you have received at NLM and any suggestions you may wish to make for improvements or changes in future training courses.

1. Course prerequisites:

2. Systems mechanics-overview:

3. Chemical/Toxicological Searching:

- a. CHEMLINE
- b. TOXLINE
- c. RTECS
- d. TDB

4. Special application clinics

MEDLINE/MeSH

CANCERLINE:

SERLINE:

CATLINE, AVLINE, NAF:

BIOETHICS, HISTLINE, HEALTH, EPILEPSYLINE:

(National Library of Medicine, Advanced Online Training Class Evaluation)

Page 2

6. Search formulation sessions:

7. Topics which should be added or omitted:

8. Aspects of the course you particularly liked or disliked:

9. Any additional comments or suggestions:

Your name (optional) and dates of training:

(University of Dayton Research Institute)

NAME _____

1979 to Present (August 1979 on)

BASIC CLASS EVALUATION

1. Please mark the one response which most accurately describes what your major involvement with the CIRC II system will be. (Check one)
 - [11] a. I will search CIRC II to obtain my own information which I will use for other tasks.
 - [19] b. I will search CIRC II to obtain information for someone else.
 - [1] c. I will use information from CIRC II which someone else obtains for me; I will not search the system myself.
 - [20] d. I must know something about CIRC II to do my job but I do not regularly search the system or use the information it contains.
 - [5] e. Other (please describe).

2. I anticipate my average weekly usage of the system (for both secure and non-secure sessions) will be: (Check one)
 - [5] a. 0 hours
 - [10] b. less than a half hour
 - [14] c. 1/2 - 2 hours
 - [9] d. 2-5 hours
 - [8] e. 5 hours or more.

3. Please rate your level of understanding of the following features:

(UDRI, Basic Class Evaluation)

	Still Somewhat Confusing	Had Some Difficulty at First, but I Now Understand	I Understood From the Start
1. sign-on	1	10	32
2. ...off	1	8	36
3. ...off cont	2	12	30
4. ...search	2	18	21
5. paragraph searching	9	23	14
6. ...select	2	26	16
7. or-and-not	3	18	25
8. par-sen-adj	2	20	23
9. backreferencing	8	19	19
10. parentheses	8	17	21
11. using mixed operators with backreferencing & parentheses	12	15	19
12. ...browse	2	22	22
13. newspec	2	23	21
14. ...print	2	27	17
15. ...mail	3	18	22
16. truncation	4	20	22
17. root	1	19	24
18. literals	2	18	26
19. ...display	2	11	33
20. ...purge	2	13	31
21. ...change	2	16	28
22. ...save/...exec	4	20	22
23. ...comment	9	19	18
24. ...send/...recv	7	16	22
25. ...help	4	14	28
26. CBAT	4	20	22
27. FACL	8	27	10
28. CREF	17	18	6
29. XLAX	18	18	6
30. PFLN paragraph	18	24	5
31. PFLN equates/relates	21	18	7
32. PFLN relationship and attribute codes	22	15	8
33. using the PFLN codes (searching with)	19	18	11
34. using the PFLN microfiche	15	19	7

4. For those features in Question #3 which you marked "Still Somewhat Confusing", please list their number(s) in the space next to the most accurate response:

3(1); 28(5); 29(6) Wasn't discussed in class.
22, 23, 26, 27, 33(2);
5(2); 32(5) Was mentioned, but needed greater explanation.
22, 23(2); 5, 7, 8, 9, 11,
30, 32, 33(4); 31(5) I tried to use it in terminal practice problems, but it didn't work well.

5. Are there any commands or techniques which you feel should have been covered in greater depth in class?

(UDRI Basic Class Evaluation)

6. Which aspects covered in the course will be particularly helpful once you are back on the job? Were they presented clearly and completely enough that you will feel at ease using them?

7. a. Were any of the materials distributed in class particularly helpful or useless? Which ones?

- b. Should any additional information be covered in handouts that at present is not?

(UDRI Basic Class Evaluation)

8. Appropriateness of terminal practice problems (check as many as applicable).

30 a. well placed.
1 b. did not come at appropriate times during the course.
7 c. too simple.
1 d. too complex.
26 e. level of difficulty was about right.
0 f. too many problems.
8 g. not enough problems.
21 h. the problems were fine.

COMMENTS _____

9. What, in your opinion, makes a good searcher? How did the training package help you develop those characteristics? In what ways can it be improved?

(University of Dayton Research Institute)

NAME _____

1979 to Present (November 1979 on)

ONLINE PROFILE EVALUATION

1. Please rate your level of understanding of the following features:

	STILL SOMEWHAT CONFUSING	HAD DIFFICULTY AT FIRST BUT I NOW UNDERSTAND	UNDERSTOOD FROM THE START
<u>FROM</u>			
1. customer identification information	_____	7	21
2. initial profile construction	2	10	17
3. ..END	_____	11	17
4. ..SAVE procedures	_____	9	18
<u>PROFILE MODIFICATION</u>			
5. function of PCN (profile control number)	_____	7	21
6. ..EDIT	_____	12	16
7. MODIFY subcommand	2	10	16
8. ADD	2	11	15
9. DELETE	2	8	18
10. REPLACE	2	10	16
11. LIST	1	9	18
12. INDEX subcommand	1	9	19
13. ..OFF TEMP	_____	8	20
<u>PROL</u>			
14. use of logical operators	2	4	22
15. use of truncation	1	7	20
16. document structure	1	11	16
a. PRN (Profile Reference Number)	1	10	17
b. COMMENT	1	9	18
c. PROFILE	1	11	15
17. COPY function in ..EDIT	2	11	15

(UDRI, Online Profile Evaluation)

2. For those features in Question 1 which you marked "Still somewhat confusing", please list their number(s) in the space next to the most accurate response:

Was not discussed in class

2(1); 7-12(1); 14(1) Needed greater explanation

7(1); 19(1) I tried to use it in terminal practice, but am still confused.

3. Are there any commands or techniques which you feel should have been covered in greater depth in class?

4e. Were any of the materials distributed in class particularly helpful. Which ones, and why?

4f. Were any materials particularly confusing? Which ones, and why.

5. Please include here any additional comments you may have in regards to materials covered.

(University of Pittsburgh On-Line Training Center)

Evaluation Form

We would like to have your personal opinion on various aspects of the training session.

1. Presentation of material was:

Too fast About right Too slow

2. Amount and frequency of review:

3. Did you feel your time on the Emulator was:

Too long Enough Not enough

Too much supervision	Right amount of supervision	Not enough supervision
----------------------	-----------------------------	------------------------

4. Concerning your time on the Commercial system:

<u>Too much supervision</u>	<u>Right amount of supervision</u>	<u>Not enough supervision</u>
-----------------------------	------------------------------------	-------------------------------

5. Concerning the total duration of the training period:

Too long About right Too short

-2-

6. I feel that I can do an adequate search for a user on the commercial system.

Yes

No

Perhaps

7. As a result of this training session I now feel that with the aid of a printed manual, I could teach myself another commercial system:

Yes

No

Perhaps

8. We would appreciate any comments or suggestions for the improvement of the training session.

American Society for Information Science
EVALUATION FORM FOR EDUCATION ACTIVITIES
COURSE TITLE _____

A. PERSONAL INFORMATION

1) Current employment status:

Description of position _____

Years of experience as an information professional _____

2) How would you assess your knowledge of the material covered in this course?
(check as many as apply)

Before Course	After Course	
<input type="checkbox"/>	<input type="checkbox"/>	Unfamiliar with the material.
<input type="checkbox"/>	<input type="checkbox"/>	Familiar with the material in a very general sense.
<input type="checkbox"/>	<input type="checkbox"/>	Familiar with the material and the basic concepts/theories and/or methods/techniques underlying it.
<input type="checkbox"/>	<input type="checkbox"/>	Understand many of the concepts/theories and/or methods/techniques underlying the subject of this course and able to apply them in practice.

B. GENERAL ARRANGEMENTS

1) How would you rate the pre-course information and orientation? (Circle only one number)

1 _____ 2 _____ 3 _____ 4 _____ 5 _____
Poor Average Excellent

2) How would you rate the facilities (room, living accommodations, food) provided for the course?

_____ outstanding _____ comfortable _____ adequate
_____ substandard _____ not applicable

3) How would you rate the audiovisuals, handouts, and other materials?

_____ outstanding _____ adequate _____ substandard

C. COURSE ARRANGEMENTS

1) Was the course what you expected from the announcements?

_____ yes _____ too elementary _____ too advanced

2) Was the level of the course suitable for your needs?

_____ about right _____ too elementary _____ too advanced

3) What is your opinion of the total work load of the course?

_____ about right _____ too heavy _____ too light

4) What is your opinion of the length of time allowed for the course?

_____ about right _____ too long _____ too short

5) Rate the balance of time allowed for each topic. (Circle only one number)

1 _____ 2 _____ 3 _____ 4 _____ 5 _____
Poor Average Excellent

6) Were the presentations scheduled in logical sequence? (Circle only one number)

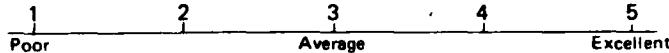
1 _____ 2 _____ 3 _____ 4 _____ 5 _____
Poor Average Excellent

7) Was the variety of presentations sufficient to maintain your interest? (Circle only one number)

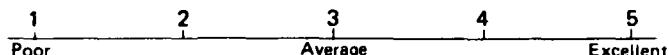
1 _____ 2 _____ 3 _____ 4 _____ 5 _____
Poor Average Excellent

8) Was the course practical in terms of your needs? (Circle only one number)

- 115 -



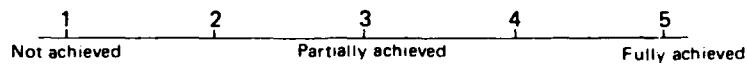
9) Did the course provide adequate theory on the subject? (Circle only one number)



D. SPEAKERS (Rate the speakers on the following aspects of their presentation on a scale of 1 ("poor") to 5 ("excellent") with 3 being "good")

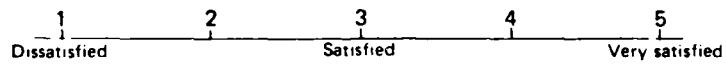
Speaker	Preparation	Command of Subject	Clarity and Organization

E. ACHIEVEMENT OF COURSE OBJECTIVES (Refer to the stated objectives of the course and rate their degree of achievement by circling the number on the scale that reflects your opinion)



F. SUMMARY EVALUATION

1. How would you rate your satisfaction with the course as a whole?



2. General comments (Add below any further comments you may have on any aspect of the course)

G. FUTURE COURSES

Are there any other topics or subjects that you would like to see presented in the ASIS Continuing Education Program?
If so, please state below.

Name: _____
(optional)

PLEASE RETURN TO: ASIS CONTINUING EDUCATION PROGRAM, 1010 Sixteenth St., N.W., Washington,
DC 20036.

REQUEST, AUTHORIZATION, AGREEMENT AND CERTIFICATION OF TRAINING		A. Agency, code agency subelement and submitting office number (example—xx-xx-xxxx)		B1	B. OFFICE USE ONLY				
				B2	C. Request status (Mark (X) one): <input type="checkbox"/> Initial or Re-submission <input type="checkbox"/> Correction or Cancellation				
Section A—TRAINEE INFORMATION						D2			
1. Applicant's name (Last - First - Middle Initial) Indicate preferred title (example—Miss, Mrs., Mr., Ms., etc.)		Enter first 5 letters of last name	B3	2. Social Security Number		B4	3. Date of birth (Year and month) <small>(example—born January 14, shown as 43/01)</small>		B5
4. Home address (Number, street, city, State, ZIP code)				5. Home telephone		6. Position level (Mark (X) one only)			
		Area code	Number	<input type="checkbox"/> a. Non-supervisory	<input type="checkbox"/> c. Manager	<input type="checkbox"/> b. Supervisory	<input type="checkbox"/> d. Executive		
7. Organization mailing address (Branch-Division/Office/Bureau/Agency)				8. Office telephone		9. Continuous civilian service		10. Number of prior non-government training days	
		Area code	Number	Ext	Years	Months			
11. Position title/function				12. Pay plan/series/grade/step		13. Type of appointment		14. Education level	
15a. Name and mailing address of training vendor (No., street, city, State, ZIP code)						15b. Location of training site (If same, mark box) <input type="checkbox"/>			
16. Course title and training objectives (Benefits to be derived by the Government)									
17. Catalog/Course No	18. Training period (6 digits)		B6	19. No of course hours (4 digits)		B7	20. Training codes (See instructions)		
	<input type="checkbox"/> a. Start	<input type="checkbox"/> b. Month	<input type="checkbox"/> c. Day	<input type="checkbox"/> a. During duty	<input type="checkbox"/> b. Non-duty	<input type="checkbox"/> c. TOTAL	B8	b. Purpose	Code
	<input type="checkbox"/> b. Complete						<input type="checkbox"/> a. Duty	<input type="checkbox"/> b. Non-duty	Code
							<input type="checkbox"/> b. Type	<input type="checkbox"/> c. Source	<input type="checkbox"/> d. Special interest
Section C—TERMINATION AND EVALUATION DATA (To be completed by Trainee)									
21. Course was completed <input type="checkbox"/> a. Yes <input type="checkbox"/> b. No—Return this form with a memo explaining circumstances	22. Actual course dates (Month/day/year)						23. Actual course hours		24. Academic grade/score
	a. Commenced Month	Day	Year	b. Completed Month	Day	Year	a. Duty	b. Non-duty	
25. All sessions were attended <input type="checkbox"/> a. Yes <input type="checkbox"/> b. No—Explain _____									
AREAS OF EVALUATION <small>(Place (X) in appropriate column to indicate your evaluation of items 26 through 37. Do not attempt to split a rating)</small>									
Rating									
A B									
26. Stated objective accomplished	A = Yes B = Partially C = No								
27. Coverage of subject matter	A = Excellent B = Sufficient C = Poor								
28. Organization of subject matter	A = Well organized B = Adequate C = Poorly organized								
29. Suitability of instructional materials	A = Excellent B = Adequate C = Poor								
30. Level of difficulty	A = Too advanced B = Appropriate C = Too elementary								
31. Length of course	A = Too long B = Appropriate C = Too short								
32. Amount of outside of evening work	A = Too much B = Appropriate C = Insufficient								
33. Effectiveness of instructors	A = Excellent B = Good C = Poor								
34. Applicability of subject matter to the job	A = Significant B = Adequate C = Insignificant								
35. Facilities	A = Excellent B = Good C = Poor								
36. Recommendation to colleagues	A = Highly recommend B = Recommend C = Not recommended								
37. Short career development plans	A = Yes B = No C = Not applicable								

Section C - TERMINATION AND EVALUATION DATA (To be completed by Trainee) - Continued

38. Comments on strong points of course

39. Comments on weak points of course

40. What were your objectives in taking this course? Were they met?

41. Do you recommend this program for others? If so, whom?

42. Additional comments

43. Signature of trainee

Date

Section D - SUPERVISORY COMMENTS (To be completed by employee's immediate supervisor)

44. Have you discussed this course and its application to the job with this employee?

a. Yes b. No

45. What were your objectives in having employee attend course?

46. Were the objectives of the training achieved?

47. Additional comments

48. Signature of supervisor

Date

PERSONNEL USE ONLY

APPENDIX C

ADVANTAGES AND DISADVANTAGES OF INSTRUCTION METHODOLOGIES

The pages that follow reproduce material from the report, Managerial and Supervisory Training Techniques and Methods, U.S. Civil Service Commission, Bureau of Training, 1977, on the following methodologies:

- Lecture
- Slide/Tape Presentation
- Instructional Film
- Instructional Television
- Self-Paced Instruction
- Coaching
- Planned Exercises
- Correspondence Study

Lecture - Lecturette

The lecture, an oral presentation prepared and delivered by a subject-matter expert, is probably the oldest and most basic form of instruction. It is used to supply the greatest amount of information in the least time. Like other types of information presentation, it does not allow for feedback from the learners; thus, it should be combined with participative techniques whenever possible.

How It Can Be Used:

1. To introduce concepts, identify and analyze problems, or clarify issues related to supervisory and managerial functions.
2. To deliver training content which is best presented all at once in an orderly manner and does not require practice.

Who Can Benefit from It:

1. Trainees who have similar needs and similar capabilities to learn the material.
2. Managers and supervisors who are highly motivated to learn but short of time.

Advantages:

1. Lectures are efficient in terms of time, facilities needed, and the number of participants who can be trained at one time.
2. The lecturer retains control over the learning content.
3. This technique may be more acceptable than others are to participants who are accustomed to a traditional teaching-learning situation.
4. Lectures can easily be varied to suit trainees' needs and can be used with almost any other training technique.

Disadvantages:

1. Participants usually have no opportunity to make comments, ask questions, or otherwise show that they understand the material presented.
2. The lecturer must be qualified both as a subject-matter expert and as a speaker.
3. Long lectures (over 40 minutes) may not be readily learned or remembered. Lecturelettes are shorter and can be highly effective.
4. Listeners might not make the transfer from intellectual understanding to practical application.

Materials:

1. Some books dealing with supervisory and managerial training contain outlines for lecturing on pertinent topics.
2. Lectures are often more effective if supplemented by visual materials such as handouts, slides, chalkboard notes, etc.

Procedures:

1. Analyze audience needs.
2. Determine objectives.
3. Plan lecture.
4. Present lecture, listing main points and then expounding on them.
5. Summarize main points.

For More Information:

International Labour Office. *An Introductory Course in Teaching and Training Methods for Management Development*. Geneva, 1972.

Pfeiffer, J. William, and John E. Jones. *The 1972, 1973, 1974, 1975, 1976 Annual Handbook for Group Facilitators*. La Jolla, CA: University Associates Publishers, Inc., 1974 (Also 1972-76).

Staton, Thomas R. *How to Instruct Successfully: Modern Teaching Methods in Adult Education*. New York: McGraw-Hill, 1960.

The Slide/Tape Presentation

With the advent of inexpensive, portable machines for synchronizing still visuals and sound, the most basic audiovisual system was created. Although relatively new, the slide/tape presentation is now in wide use for both group and self-paced instruction. It is used in conference rooms, in classrooms, in individualized learning centers, and for on-the-job training. Several slide projectors can be used with a controller and tape player for a multi-screen presentation.

How It Can Be Used:

1. To reinforce information presented orally with visual cues.
2. To stimulate interest in the topic being discussed.

Who Can Benefit from

It:

All levels of managers and supervisors.

Advantages:

1. Slides and tapes can be presented together or separately; for example, the slides can be used first with the tape and later, as the narrative changes, with a lecture.
2. After the initial equipment and taping expenses are met, the presentation can be repeated many times at little cost.
3. The slide/tape production equipment is relatively inexpensive.

Disadvantages:

1. The slide/tape show by itself does not allow for discussion, interaction, or practice unless it is specifically designed to do so.
2. Two pieces of equipment must be used together, possibly causing problems in coordination.
3. Preparation of tapes, slides, and scripts requires considerable expertise; most training offices have to contract for the service from an outside source.

Materials:

1. A slide-synchronizing tape player plays a tape with prerecorded advance pulses that control a compatible slide projector. With non-automatic equipment slides are advanced manually.
2. Slide/tape presentations for supervisor and manager training are available from firms which produce instructional media.

Procedures:

1. When used with groups, the presentation may be introduced, allowed to run without interruption, and then discussed. If the presentation is a long one, the trainer may wish to stop at intervals for a question and answer period.
2. The slide/tape presentation may also be used with workbooks in self-paced instruction.

Related Approaches:

Slide/tape presentations (sometimes called Slide/Sound Shows) are often used in Programmed Instruction. Also, see references for Audiovisual Aids and Techniques.

For More Information:

Bergevin, P., D. Morris, and R. M. Smith. *Adult Education Procedures: A Handbook of Tested Patterns for Effective Participation*. New York: The Seabury Press, 1963.

Otto, Calvin P., and Rollin O. Glaser. *The Management of Training: A Handbook for Training and Development Personnel*. Reading, MA: Addison-Wesley, 1970.

Pula, Fred John. *Application and Operation of Audiovisual Equipment in Education*. New York: John Wiley & Sons, Inc., 1968.

Rigg, Robinson P. *Audiovisual Aids and Techniques in Managerial and Supervisory Training*. London: Hamish Hamilton, Ltd., 1969.

The Instructional Film

The practice of presenting information through films has been widely accepted by the training community for many years. Films offer the advantages of virtually all other media in an easy-to-use format. Films can combine the benefits of other means of presentation (still visuals, print, lecture, etc.) to enhance instructional content.

How It Can Be Used: 1. To demonstrate ideal ways of doing such tasks as interviewing and counseling.

2. To illustrate new concepts and techniques.

3. To take the place of the instructor when he or she cannot be present.

4. To teach human relations, an important part of supervisor and manager training.

Who Can Benefit from

It:

Films can be used in virtually any training situation.

Advantages:

1. Films standardize the dissemination of information; variations among instructors are eliminated.

2. The person who runs the film can control time and space in ways unparalleled with other media—animation, magnification, slow and fast motion, etc.

3. Of all information presentation techniques, films are the most likely to catch and hold the full interest of the participants.

4. A lecture, demonstration, skit, or discussion that is filmed can be used many times.

Disadvantages:

1. Since the training room usually must be darkened during the film, the instructor misses the trainees' immediate reactions to it. Also, trainees may not be able to take notes.

2. Equipment and facilities for presenting films are not always available.

3. Unless trainers are able to contract for the production of special films, they must rely on standard training films in which some of the content may be inappropriate. Sometimes, but not always, the trainer may be able to use just part of a film.

Materials:

Films are available from a number of instructional media firms. Most Government agencies with training functions have film catalogs.

Procedures:

1. Preview films to be sure that they contribute to the fulfillment of the learning objectives.

2. Introduce the film and specify learning objectives.

3. Allow time for the participants to discuss the film after viewing it.

Related Approaches:

Movies, Training Films, and Audiovisual Aids.

For More Information:

Bergevin, P., D. Morris, and R. M. Smith. *Adult Education Procedures: A Handbook of Tested Patterns for Effective Participation*. New York: The Seabury Press, 1963.

Brown, James W., Richard B. Lewis, and Fred F. Harclerode. *AV Instruction: Media and Methods*. New York: McGraw-Hill, 1973.

Otto, Calvin P., and Rollin O. Glaser. *The Management of Training: A Handbook for Training and Development Personnel*. Reading, MA: Addison-Wesley, 1970.

Pula, Fred John. *Application and Operation of Audiovisual Equipment in Education*. New York: John Wiley & Sons, Inc., 1968.

Rigg, Robinson P. *Audiovisual Aids and Techniques in Managerial and Supervisory Training*. London: Hamish Hamilton, Ltd., 1969.

Instructional Television

Instructional television is comparable to film in its uses and advantages. An effective television presentation brings the action to the viewer; trainees have a chance to observe things which would be very difficult to replicate in a classroom. Like other means of audiovisual presentation, television can be used in individual instruction, particularly when the tapes are in video cassette form.

How It Can Be Used:

1. To record a role play, discussion, or presentation and replay it for detailed examination.
2. To record a session for viewing by persons unable to attend.
3. To demonstrate desirable performance in a more realistic setting than the classroom.
4. To take the place of the instructor when he/she cannot be present.

Who Can Benefit from It:

Supervisors and managers at all levels.

Advantages:

1. Television can take management training out of the academic realm and place it in an environment which more closely resembles the real world.
2. Presentations can be taped ahead of time; trainees can replay parts of the tape as often as needed.
3. In the form of video cassettes, television presentations are more convenient and often less costly to produce than films.
4. Video cassettes are more adaptable to small groups than is film.
5. Video cassettes can be set up and operated more easily than film can.
6. Most trainers can handle the mechanics of showing a television presentation; thus it is easy for them to tailor a presentation to the needs of a particular group.

Disadvantages:

1. The videotape player and monitor are more expensive than a film or a slide projector and screen.
2. The viewing area is limited to the size of the monitor. It may be too small to be seen by large groups.

Materials:

1. Video cassette tapes for individual instruction are available from training media sources.

Procedures:

1. Preview prerecorded tapes as you would a film.
2. Introduce the tape and go over the learning objectives.

Related Approaches:

Closed Circuit TV, Audio Cassette Tapes, Programmed Instruction, Audiovisual Aids.

For More Information:

Brown, James W., Richard B. Lewis, and Fred F. Harclerode. *AV Instruction: Media and Methods*. New York: McGraw-Hill, 1973.

Otto, Calvin P., and Rollin O. Glaser. *The Management of Training: A Handbook for Training and Development Personnel*. Reading, MA: Addison-Wesley, 1970.

Pula, Fred John. *Application and Operation of Audiovisual Equipment in Education*. New York: John Wiley & Sons, Inc., 1968.

Rigg, Robinson P. *Audiovisual Aids and Techniques in Managerial and Supervisory Training*. London: Hamish Hamilton, Ltd., 1969.

Self-Paced Instruction

Self-paced instruction is a training method in which the content is presented by means of programmed study materials rather than by an instructor. It can be used by an individual or integrated with group instruction. Programs have the following features:

1. The material to be presented is carefully and logically organized.
2. The content of the program is presented in segments or exercises. Before the learner can proceed to the next segment, he/she must respond to the first one.
3. Learners find out immediately whether they have mastered each segment of material.

Self-paced instruction uses a variety of media, including books, audio tape, slides, films and television. Quite often, combinations of media are utilized. Programs are prepared according to the following principles:

1. The program is designed to accomplish a set of objectives. These objectives are precise statements of the behavior to be learned by the student. Objectives are derived from an analysis of the tasks to be performed on the job.
2. The program is tested. If the learners do not score well on criterion test items or exercises, the program is revised and retested. This process continues until a sampling of the target population is able to complete the program at a predetermined level of achievement.

How It Can Be Used:

1. To teach principles, concepts, and techniques that do not require practice or demonstration.
2. To give learners the information they may need as background if they are to profit from such other techniques as group discussion, role playing, and case studies.

Who Can Benefit from

It:

With appropriately developed programs, self-paced instruction can be used for all levels of supervisors and for mid-level managers.

Advantages:

1. This method can be adapted to the individual's needs and to the amount of time that is available for training.
2. Because so many media and sources of information can be used, the training content for self-paced instruction is almost unlimited.
3. Getting immediate feedback on what has been learned increases the learner's confidence and motivation.

Disadvantages:

1. Self-paced learning should be supplemented by other training approaches if practice in applying the learning is needed.
2. Whether the training is used on the job depends on the motivation of the individual learner.
3. The cost of developing self-paced instructional materials can be high.
4. Developing self-paced instruction involves analysis and specification of behavioral objectives. It also involves designing, testing, and retesting materials. This requires more time, effort, and talent than many other methods of instruction.

Procedures:

1. Before the learner begins studying the material, he/she is introduced to both the material and any equipment that he/she may have to use. If the course is taught in a learning center (LC), the LC coordinator responds to student-initiated requests for information and/or clarification, observes progress, and provides necessary assistance. If subject matter experts are available, the coordinator will arrange for them to be available to the learner if and when needed.
2. Self-paced instruction can be integrated with conventional group methods: after completion of a segment of materials the instructor conducts group discussion designed to reinforce participant learning gained through use of the programmed material.

Related Approaches: Programmed Instruction, Personalized Self-Instruction, Programmed Learning.

Coaching

Coaching usually involves a one-to-one relationship between the "coach" (a supervisor or manager who is more experienced or at a higher level than the person being coached) and the understudy, but coaching sessions can be held for groups as well. Besides the obvious benefits to the understudy's professional development, the time spent working closely with a superior often makes the participant more confident about his or her own abilities and more comfortable about dealing with other superiors. Coaching is an ideal form of training for supervisors and managers in that they gain experience in dealing with situations as they arise, yet there is constant supervision from a knowledgeable coach.

How It Can Be Used:

1. To promote the interchange of information between different levels of supervision or management.
2. To prepare an understudy to assume a particular position.
3. To continue particular managerial philosophies or approaches.

Who Can Benefit from It:

1. Newly appointed supervisors and managers.
2. Persons chosen to assume the same position as the coach's but in another location.

Advantages:

1. The coaching can be geared specifically to an individual's needs and capacities.
2. Contact with the coach is nearly continuous.
3. The learner has the benefit of both his/her own experience and that of the coach.

Disadvantages:

1. How valuable the training is depends to a large extent on the coach's competence as a coach.
2. It is sometimes difficult to get supervisors or managers at higher levels to devote the large amount of time needed for good coaching.
3. In some instances, the understudy is merely an observer or mimic of the coach's behavior.

Procedures:

1. The coach and the understudy agree on what will be required of each during the coaching.
2. The understudy's learning needs are prioritized and the coach is advised of the priorities.
3. If desired, a written training plan can be worked out.
4. The training office assists by planning learning objectives, by supplying developmental materials such as reading lists, and by conducting special developmental activities.

Related Approaches: Understudy.

For More Information:

Craig, Robert L. (Ed.). *Training and Development Handbook* (Sponsored by ASTD). New York: McGraw-Hill, 1976.

Kirkpatrick, Donald L. *A Practical Guide for Supervisory Training and Development*. Reading, MA: Addison-Wesley, 1971.

Singer, Edwin J. *Effective Management Coaching*. London: Institute of Personnel Management, 1974.

Planned Exercises

Planned developmental experiences offer the advantages that job rotation and coaching offer, but most of them do not require that the employee leave his or her present position or have the continuous attention of a superior. A well designed program of planned experiences can have the same results as coaching or job rotation. Some types of planned experiences are:

Special assignments or special projects (for example, a study to determine the advisability of setting up a new organizational unit). These assignments can be used equally well for developing employees' skills in specific areas of interest or for familiarizing them with the overall operations of the organization.

Work on committees or task forces. This provides experience in working with others and sometimes in researching and preparing reports. Often employees make important contacts with others in the field through such work.

Membership in professional societies, advisory groups, etc. While representing his or her organization at meetings, the participant is promoting professional contacts and is keeping up on developments in the profession.

Assignments as acting manager or supervisor. This is an excellent way to fill the position of a temporarily absent supervisor or manager while training the subordinate at the same time. The subordinate should be given full responsibility when possible.

How They Can Be Used:

1. To provide experience that the employee cannot get in his or her current position.
2. To enhance the participant's abilities in the areas of problem solving, cooperation, and advocacy.

Who Can Benefit from Them:

1. Depending on the experiences provided, all levels of supervision or management can profit from them.
2. This approach is especially beneficial for persons whose present jobs are somewhat narrow.

Advantages:

1. Assignments that allow for new experiences help supervisors and managers to assess their own performance in different situations; they also can provide indications of competencies in other areas.
2. Trainees usually gain from the outside experiences skills that help them in their regular jobs.
3. A person's development will be more rounded if he/she has had a variety of planned experiences.

Disadvantages:

1. Whether an individual's developmental objectives can be met depends on the availability of appropriate experiences.
2. Special assignments must be made carefully so as not to infringe on the responsibilities of other organizational units.
3. An assignment may "get the job done" but not yield a planned experience.

Procedures:

1. The training office can suggest possible experiences to the supervisor of persons for whom the experiences would be appropriate.
2. Information on past assignments and the participant's reactions to them should be kept by the training office.

Related Approaches: Planned experiences are also referred to as **Planned Individual Development** and **Outside Assignments**.

For More Information:

Byers, Kenneth T. (Ed.). *Employee Training and Development in the Public Sector*. Chicago: International Personnel Management Association, 1974.

Tracey, William R. *Designing Training and Development Systems*. New York: American Management Association, Inc., 1971.

In this type of training, the supervisor/manager usually receives the necessary study materials through the mail. Working at his or her own pace, the student completes lessons one at a time and mails the responses to test items to a correspondence center. The responses are quickly graded (often by machine) and returned. Several lessons make up a course or learning module.

How It Can Be Used:

1. To teach cognitive skills.
2. To introduce basic information which can be expounded upon later in face-to-face instruction.

Who Can Benefit from It:

1. Entry-level management and supervisor trainees.
2. Managers and supervisors who want to familiarize themselves with new concepts or techniques.

Advantages:

1. This approach provides for the regular evaluation of individual learning achievement throughout the course.
2. The employee's work is not necessarily interrupted since studying is not usually done during work hours.
3. Because there are no additional expenses beyond those of the tuition and the materials, correspondence study is often less expensive than other training.
4. If employees cannot conveniently be assembled, correspondence courses can be used to provide the same lessons to each of them.

Disadvantages:

1. Prepared correspondence courses which address the particular needs of managers and supervisors may not be available.
2. Instructional objectives for this method are limited to those for which competency can be demonstrated through responses to a paper-and-pencil test.
3. Correspondence courses must be supplemented by other training approaches when the training required involves developing interaction skills or similar participatory skills.
4. It is often difficult to prepare "student-motivating" instructional components.
5. Completion rates are significantly lower than those for other types of training.

Materials:

1. Emphasis should be placed on selecting courses with the appropriate objectives since the course usually cannot be modified to account for changes in subject matter or for the needs of individual learners.
2. Course materials and strategy should be validated for the learner's characteristics and learning environment. This is especially important since the student works alone.

Procedures:

1. The person who arranges for the course should verify that all of the instructional materials are available to the learner; some correspondence courses require reference material and audiovisual equipment not supplied with the lessons.
2. The student must be told the objectives, the criteria for success, and the consequences of late submissions, wrong answers, etc.
3. If possible, the student should have an opportunity to contact an instructor (perhaps by telephone) to ask questions, get feedback on performance, etc.

Related Approaches: Extension Courses, Home Study.

For More Information:

Craig, Robert L. (Ed.). *Training and Development Handbook* (Sponsored by ASTD). New York: McGraw-Hill, 1976.

Erdos, Renee F. *Teaching by Correspondence* (A UNESCO Source Book). London: Longmans, Green & Co. Limited, 1967.

APPENDIX D
ANALYSIS OF QUESTIONNAIRE RESPONSES

Introduction

As is discussed in the Study Methodology section of this report, a questionnaire was developed to obtain trainee impressions of the courses they attended. The 16 questionnaires (13% return) received were a disappointingly small response. They provide too little data to be definitive. Discussion of the responses was, therefore, excluded from the main report and appears in this Appendix.

The Questionnaire

A copy of the 3-page questionnaire is given on pages 91-93. The original was on legal-size paper.

From a question design standpoint, DTIC may wish to consider the rating scale format used for questions 2 and 9 in an evaluation instrument. Provided that the number of options is not too large to obliterate distinctions, people usually find this format more adaptable to the assessments they want to express than a more restrictive format. For example, Part III of DDC Form 345 might be amenable to restructuring.

The Responses

Tables 1 and 2 summarize the responses to Questions 1 and 14. Not unexpectedly, usage of the Lockheed, SDC, and BRS systems correlates with training courses that respondents attended. The advanced courses appear almost as popular as the introductory courses. Question 14 responses indicate a popularity of the New York Times database. The distribution by year of the training experiences indicates that perhaps half of the respondents have 3 and 4 years of searching experience, and almost all appear to have been searching for at least one year. Responses to Question 14 showed moderately heavy multiple database usage. Five respondents use 5 or more of the online

TABLE 1

3. Whose programs for teaching the online use of databases have you attended?

Please indicate when you had the education/training by marking the appropriate boxes. Please note ALL programs that you have had.

Program	Approximately how long ago did you have the program?					
	In 1980	In 1979	In 1978	In 1977	In 1976	1975 or earlier
1. BRS - Introductory	3	1	2	1	1	
2. BRS - Advanced		1		1		
3. Lockheed - Introductory	1	3	2	2	3	1
4. Lockheed - Advanced	1	4		2	1	1
5. SDC - Introductory		1	5	2	1	1
6. SDC - Advanced		4	1	1	1	1
7. NLM - MEDLINE		2	2			3
8. LEXIS		1				
9. OCLC	1		1		1	
10. DTIC (formerly DDC)	1					1
11. DOE/RECON	1	2	1			
12. NASA/RECON			1			
13. CISTI - CAN/OLE				1		
14. Cuadra Associates				1		
15. On-the-job, formal	2	1	2	2	1	1
16. On-the-job, informal	2	2	3			2
17. University - short course (1 week)			1			
18. University - short course (2 weeks)				1		
19. University - regular course (qtr, semestr)					1	2
20. Other (pls specify)	6	2	3	2		
21. Other (pls specify)						
22. Other (pls specify)						
Totals	18	25	23	16	10	13

TABLE 2

14. How frequently do you use the vendor systems listed below?
Please note ALL that apply

	4 or more hrs/day	2-4 hrs/day	0-2 hrs/day	approx 6-8 hrs/wk	4-6 hrs/wk	2-4 hrs/wk	occasionally	Totals
BRS			3			1	3	7
Lockheed	1	2	3			2		13
SDC	1	1	3			2	3	10
OCLC			1				1	2
MEDLINE			3				1	4
N Y Times		2	2			3		7
NASA/RECON			2					2
DOE/RECON			1			1	3	5
LEXIS		1						1
WESTLAW								
CAN/OLE						1		1
DTIC						1		1
In-house files	1	1				1	2	2
Other (specify)		2						5

systems, and 4 use 3 of the systems.

It is difficult yet to know whether the usage reported in Questions 13 and 14 represent a low potential utilization of online database or a level that accords with end-user need. Current weekly usage of online systems is shown in Table 3.

The prevalent system/database use of 0-2 hours/day reported in Question 14 suggests one group of searchers who average 3/4 to 1 hour of terminal activity daily and another group who work at terminals about 3 hours daily.

A special announcement was made at the Washington, D.C., Online Users Group meeting for questionnaire responses in the hope that a good response could be obtained from federal librarians. Table 4 shows that this didn't happen. Over half of the respondents are from the for-profit sector.

The most popular, wanted teaching methodologies reported for Question 3 are:

- Lecture (12 votes)
- Discussion (6)
- Transparencies (6)
- Hands-on practice (4)

The two most disliked methodologies are:

- Role playing (4)
- Lecture only (3)

Some who voted positively for lectures specified their preference for lectures combined with online demonstrations on CRTs visible to the students. One person considered such lectures "ruined" when the computer system went down. Having experienced this unsatisfying situation, the author, when teaching, developed handout and transparency materials as backups and recommends this precaution to DTIC in this report.

Open-ended questions such as 4, 5 and 6 are a risky way of trying to obtain information because people frequently ignore them. Only 2 people did not respond in some way to Question 4. The program content mentioned the most

was hands-on practice (6 times) and search strategy examples (4 times). Other course content respondents found helpful included:

- Exchange of experiences with other participants
- Explanation of how the computer system executes various commands
- Discussion of strategies appropriate for assigned problem questions
- Database design
- Explanation of databases in the context of applying search questions to them
- Indexing policies (in advanced courses)

More hands-on practice was the most frequently mentioned suggestion (4 times) of program content respondents did not consider adequate.

Three respondents criticized the "sales pitch" content of courses, one suggesting that courses be taught by experienced searchers, not sales persons.

Others wanted more of the following content:

- Comparison of various systems (differences, advantages)
- Discussion of real-life problems, how they occur and are solved
- System documentation
- Better use of transparencies (removing them too fast for note taking criticized)

Only 7 respondents provided information for open-ended Question 6. That this question was passed over might have been predicted because it is more difficult. It asks people to reach beyond their experience and into their imagination. Content suggestions included:

- The rationales underlying the structures of databases
- System and file design (linear and inverted files, stopword list, string characteristics, etc.)
- Subscription price information
- Hands-on practice
- Difficult multi-term searches
- Management issues
- Historical (this may refer to the development of online services or the evolution of particular databases)

Respondents provided a range of 1 to 16 hours as needed to gain a working knowledge of a single database, and a range of 2 hours to 4 days for two related databases (Question 7). This is a type of question for which computation of an arithmetic mean would have little meaning. Of the people who reported attending 3 to 8 training courses, 8 individuals specified 8 or more hours for a single database. Within this group, 4 people who had attended 6 to 8 courses specified a training period of 2 or more days for 2 related databases. It is believed that more weight should be given to opinions of those with more course experience.

Table 5 shows the responses to Question 8. Respondents were about evenly divided between the sufficiency of one course and a two-course sequence provided that updates on system + database combinations are available. This response underscores the value found in updates and the importance of making them real learning experiences.

Remarks provided for Question 10 reinforced those for Questions 3, 4 and 5. Five respondents addressed content rather than type of teaching material, mentioning search strategy examples, case studies, prototype searches, and search studies such as have appeared in the periodicals, Database and Online. Other responses recommending the following materials:

- Good manuals (3 mentions)
- Handouts sufficiently comprehensive to alleviate note taking (3 mentions)
- Transparencies
- Audiovisual modules
- Charts
- Venn diagrams
- Hands-on quizzes
- Quick reference pamphlets/cards

Respondents were negative about self-teaching manuals and CAI replacements for more conventional methodologies. For self-teaching manuals, they voted

TABLE 3

13. How much online searching do you do?
Please circle the appropriate letter below.

<u>1</u>	a. Over 20 hrs/wk	<u>4</u>	d. 5-10 hrs/wk
<u>4</u>	b. 15-20 hrs/wk	<u>1</u>	e. 3-5 hrs/wk
<u>2</u>	c. 10-15 hrs/wk	<u>3</u>	f. 4-3 hrs/wk
<u>0</u> g. don't do searching			

1 No response

TABLE 4

15. What type of organization do you work for?

<u>3</u> a. For profit (not a DOD contractor)	<u>4</u> f. Federal govt. (non-military)
<u>2</u> b. For profit (DOD contractor)	<u>0</u> g. Federal govt. (military)
<u>2</u> c. For profit (information broker)	<u>0</u> h. State, local government
<u>2</u> d. Not for profit (non-academic)	<u>0</u> i. Self employed
<u>3</u> e. Not for profit (academic)	

TABLE 5

8. Which of the following alternatives do you consider the best to acquire searching proficiency? (Please circle the appropriate letter)

<u>0</u> a. A single course followed by on-the-job practice
<u>1</u> b. A beginning course, on-the-job practice; 6-12 months later, an advanced course
<u>2</u> c. A beginning course, on-the-job practice; 6-12 months later, an advanced course on the command language and system and advanced database courses
<u>4</u> d. Alternative a and periodic 1-day updates on system + databases
<u>3</u> e. Alternative b and periodic 1-day updates on system + databases
<u>5</u> f. Alternative c and periodic 1-day updates on system + databases

4 Yes	5 Maybe
6 No	1 No response

One person's "maybe" was accompanied by the note "when money is short." To CAI, they voted

2 Yes	2 Maybe
11 No	1 No response

It is likely that at least part of the above negativity is caused by a lack of familiarity. I had personally thought that CAI would not be an adequate substitute for the lecture mode until I used it (on a system previously unfamiliar to me). The experience indicates that CAI speeds learning of simple facts but it cannot be used for situations where students are likely to ask a lot of different questions and need tailored answers to learn. CAI could be used to learn basic aspects of a command language and database structure; its present drawback is the programming expense. People seem to fear the loss of contact with a human tutor.

Hoped for information about searchers, search behavior, learning needs and preferences, and database usage did not materialize from this questionnaire survey. The questionnaire, as a questionnaire, seems to have passed a field test in that respondents seemed to have little difficulty understanding and answering the questions. Write-ins for Questions 1 and 14 point to the need to add to the named courses and systems should these questions be asked again. DTIC might find it desirable to obtain information about the experiences of dialup trainees before they receive DTIC training. A modification of Questions 1 and 14 together with, possibly, Question 4 and Question 13 could provide this information. Knowing the experience trainees bring to DTIC's courses might aid the interpretation of responses to DTIC's Course Evaluation questionnaire (DDC Form 345).

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The report presents the results of a study of various instruction methodologies currently in use to teach people how to access and search computer-stored bibliographic-type databases in an online mode. The study was performed to provide DTIC management with information about practices and experiences for DTIC use in reaching decisions about its future course of action with respect to educating clientele in DTIC's access system and online databases. Discussions with experts in the online community led to the selection of		

programs of the following organizations for examination: (a) Lockheed Information Retrieval Service (LIRS) (2 programs), (b) University of Denver Graduate School of Librarianship & Information Management (GSLIM), (c) National Library of Medicine (NLM), (d) University of Dayton Research Institute (UDRI), (e) University of Pittsburgh On-Line Training Center (Pitt), (f) House Information Systems (H.I.S.) (g) Congressional Research Service, Library of Congress (CRS), and (h) Defense Technical Information Center (DTIC).

A set of criterion variables was developed by which the instruction programs were analyzed and compared. These variables address four major areas: (1) purposive documentation (goals, objectives, criteria), (2) education program (components, duration, availability, location, participants), (3) resources (human, equipment, facilities, instruction materials), and (4) evaluation/feedback mechanisms (instruments, tests, follow-ups, user groups).

Most programs are found to be weak in purposive documentation that limits the bases on which their developers can evaluate their accomplishments. Five of the programs rely on lectures as the principal mode of knowledge transfer. Pitt and H.I.S. programs integrate lecturing with hands-on practice. LIRS's ONTAP and CRS programs provide online self-instruction. Four of the programs have a multi-course structure, offering one or more advanced courses beyond the introductory one. No course other than the academic one (GSLIM) is longer than one week in duration. Only LIRS's ONTAP program is substantially location independent; all others require students to travel to either a single location or one of several locations. Although six of the courses have no course fees, the high indirect costs of travel probably prevent some individuals needing instruction from obtaining it.

Approximately 1 to 1½ months appears to be needed by an instructor to plan a program and prepare printed instruction materials for each content focus, i.e., a command language or a database. Preparation time for two or more foci appears to be cumulative, for example, 2-4 months for a command language and a database. Complex databases require more time, for example, 3 months for a UDRI manual. Time needed to revise a program and its instruction materials can vary from 3 days to 1 month dependent on the extent of the revision. By comparison, instructors can spend 10 to 100 hours to prepare one hour of computer-assisted instruction.

Only the Pitt, ONTAP, and CRS programs provide each student with a terminal; in most other programs, two people share a terminal. Irrespective of the instruction methodology employed, all programs produce printed materials for students. These vary from very brief guides to a database and retrieval options (H.I.S.) to replicas of entire lecture content (NLM).

Six of the programs distribute questionnaires to students at the end of a program to obtain a course evaluation. No program has a longer term evaluation mechanism, for example, a follow-up six months after the course. The customer service desks maintained by LIRS, DTIC, NLM, and H.I.S. provide feedback to instructors, but only for NLM is this direct since NLM instruction staff also perform service desk duties. The user group meetings of DTIC and NLM and the update sessions of LIRS are other opportunities for feedback.

Hands-on practice is a sine qua non for these instruction programs. Practice totaling 4 to 5 hours per student is suggested for programs having the objective of providing the student with proficiency to do online searches on-the-job.

CRS's computer-based instruction (CBI) program demonstrates that the CBI methodology can be used to convey introductory-level knowledge of a command language and databases. CBI is not yet hospitable to teaching advanced search complexities. It is also expensive. The LIRS ONTAP approach, that uses computers in a more limited way, is worthy of further study. It is self-instructional and, with proper printed materials, it might be able to effectively replace up to 85% of present instruction programs.

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